T, DECEMBER 3, 1936 FIRST AERO WEEKLY IN THE WORLD JAN 14 1936 REGD. AT THE G.P.O. AS A NEWSPAPER

FLIGHT

The AIRCRAFT ENGINEER AND AIRSHIPS

OFFICIAL ORGAN OF THE ROYAL AERO CLUB SIXPENCE EVERY THURSDAY

LOCKHEED Aerodraulic ACTUATION

Complete hydraulic actuation of retractable undercarriages, wing flaps and bomb hoists.

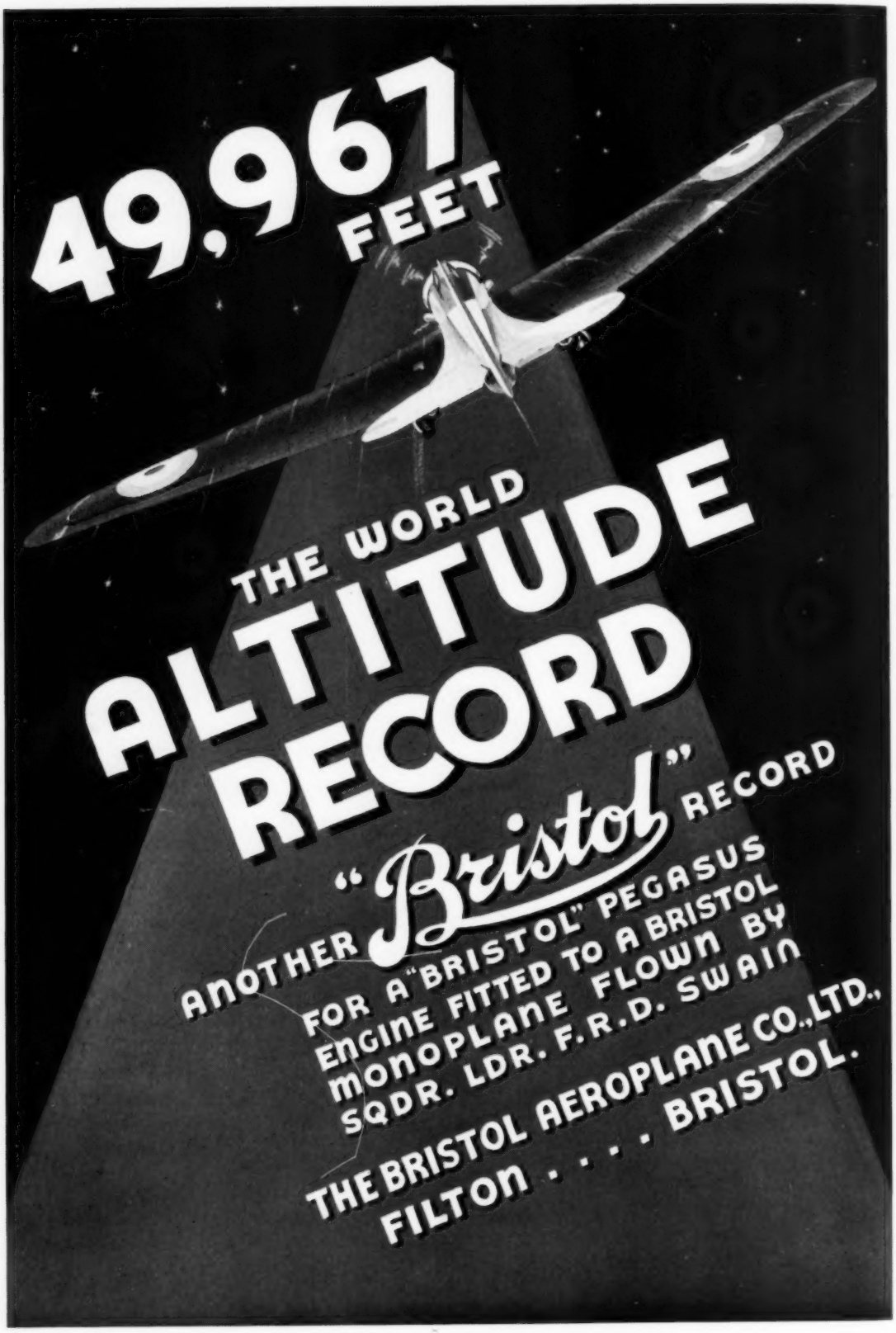
Standardised on the 'Fairey Battle' and other types of high performance aircraft.

Adopted by the British Air Ministry.

Also the Airdraulic Shock Absorber Strut as used on the Miles Peregrine.

AUTOMOTIVE PRODUCTS COMPANY LIMITED
Factory: Leamington Spa, England

LOCKHEED
hydraulic ACTUATION


49,967
FEET
THE WORLD
ALTITUDE
RECORD
"Bristol"
ANOTHER RECORD
FOR A "BRISTOL" PEGASUS
ENGINE FITTED TO A BRISTOL
MONOPLANE FLOWN BY
SQDR. LDR. F.R.D. SWAIN
THE BRISTOL AEROPLANE CO. LTD.,
FILTON . . . . BRISTOL.

FLIGHT

The AIRCRAFT ENGINEER AND AIRSHIPS

FIRST AERONAUTICAL WEEKLY IN THE WORLD : FOUNDED 1909

Editor C. M. POULSEN

Managing Editor G. GEOFFREY SMITH

Chief Photographer JOHN YOXALL

Editorial, Advertising and Publishing Offices: DORSET HOUSE, STAMFORD STREET, LONDON, S.E.1

Telegrams : Truditor, Sedist, London. Telephone : Waterloo 3333 (50 lines).

HERTFORD ST., COVENTRY.	GUILDHALL BUILDINGS, NAVIGATION ST., BIRMINGHAM, 2.	260, DEANSGATE, MANCHESTER, 3.	26B, RENFIELD ST., GLASGOW C.2.
Telegrams: Autocar, Coventry. Telephone: Coventry 5210.	Telegrams: Autopress, Birmingham. Telephone: Midland 2971.	Telegrams: Iliffe, Manchester. Telephone: Blackfriars 4412.	Telegrams: Iliffe, Glasgow. Telephone: Central 4857.

SUBSCRIPTION RATES: Home and Canada: Year, £1 15 0. 6 months, 16s. 6d. 3 months, 8s. 6d.
Other Countries: Year, £1 15 0. 6 months, 17s. 6d. 3 months, 8s. 9d.

No. 1458. Vol. XXX. DECEMBER 3, 1936. Thursdays, Price 6d

Heavy Bombers

THE Earl of Halsbury by asking in the Lords last week for particulars of the heavy bombers included in the Government's programme did useful work in focusing attention on a subject which is likely to become of very great importance in the near future, although not, perhaps, in exactly the sense the noble Earl imagined. That he received little satisfaction from Viscount Swinton need cause no surprise. His challenge to the Air Minister to publish figures for our latest bombers was foredoomed to failure. No Air Minister in any Government we have ever had has given such information, nor is it likely that one ever will.

The question is not so much which types of heavy bombers are on order. There is no secret about this; the Armstrong Whitworth Whitley and the Handley Page Harrow for a start. Rather is it a question of whether the "heavy" bomber is a type likely to survive during the next few years. Monsieur Louis Breguet, the famous French pioneer and aircraft constructor, has recently expressed the view that with the so-called heavy bomber we (all countries, of course, and not Great Britain in particular) were "on the wrong track."

After arguing, in a well-reasoned article in *Les Ailes*, that for any military aircraft speed is primordial, as it permits catching up with an opponent less fast and fleeing from one better armed, M. Breguet has the following to say of the heavy bomber:—

> "For a long time it has been assumed that speed could only be obtained at the expense of useful load, and that it followed, *ipso facto*, that bombers could only be relatively slow machines. From this has been deduced an arbitrary classification into heavy bombers and light bombers, a classification which seems due to disappear. It is this so-called heavy aviation which has led to the conception of the aeroplane with large wing area, or heavy bomber. Bombers, on account of their insufficient speed, have had to be designed for navigating at night; moreover, they have had to be equipped with heavy defensive armament: gun turrets above and below, in front and at the back."

Far more important, in a few years if not at the moment, than the relative performance of British and foreign heavy bombers, is the problem of whether or not the so-called "heavy" bomber is really worth while as a class. M. Breguet argues that military aircraft should now tend to become more and more alike in their geometry, only the actual dimensions being different. He points out that when the high-performance bomber has discharged its bomb load, having, presumably, been started by a catapult or similar means, as he foresees a wing loading of 40 lb./sq. ft., it will have all the characteristics of a fighter.

Increased Utility

After proving, to his own satisfaction at least, that the high-performance bomber of this type will be able to carry an overload of 15 per cent., thus carrying the same bomb load as the present so-called heavy bombers, M. Breguet goes on to argue that, apart from being less vulnerable owing to its greater speed, the fast bomber will possess an increased military utility in that, in a given period of time and with the same size crew, it can carry out twice as many flights as the bomber of half the speed. Thus, he argues, a machine with a speed of 600 kilometres per hour can with advantage replace two machines with a speed of 300 km/h. and it will not cost anything like so much as the two slower machines.

M. Louis Breguet, apart from being a pioneer, has had considerable success as a prophet. As long ago as 1921 he forecast the coming of the 300 m.p.h. aeroplane as a specialised high-flying aircraft. This prophecy has been fulfilled. His present "guess" is that the high-speed bomber of the future will be an aeroplane of approximately 22,000 lb. gross weight, with a wing area of only 650 sq. ft., an engine power of somewhere in the neighbourhood of 3,000 b.h.p., a speed of about 300 m.p.h.

and a range of 1,000 miles with a bomb load of 3,000 lb.

If we assume some form of artificial start assister, either catapult, "composite" aircraft or railway track, there does not seem to be any reason to doubt the feasibility of Monsieur Breguet's future high-performance bomber. In this country, also, there are many who believe the days of the single-engined, single-seater fighter to be numbered, its place being taken by a small twin-engined type, with a crew of two. If that comes about, the similarity in general geometry of the fighter and the bomber will be almost complete, and M. Breguet's forecast will be largely fulfilled.

Abolishing the Channel

WHEN Blériot flew the Channel the feat was hailed as abolishing the insularity of Britain, and in a sense that was true. Since 1914 one of our chief concerns has been that air attack has come or may come over the Channel, which makes it difficult for our defence to get timely warning. If, however, the Channel could, in a strategical sense, be abolished, our problem would be much simplified.

Mr. Baldwin gave the first hint of the possibility of strategically abolishing the Channel when he used the phrase "our frontier the Rhine." This doctrine has received further exposition in the last few days. Mr. Eden has stated categorically that if Belgium or France were attacked Britain would go to their assistance. Paris papers, in return, announce semi-officially that M. Delbos, the French Foreign Minister, will give a similar assurance that France will help Britain if she is attacked. These words are not a formal treaty or alliance, but they have all the strength of one. They certainly ought to let possible aggressors know that interference with the peace of Western Europe will be a very dangerous game. That, by itself, should make war unlikely.

From the point of view of air defence the welcome prospect is held out that if Britain were to be attacked she could count on raid warnings coming from the other side of the Channel. No longer should we be saying that it only takes a hostile bomber so many minutes to get from the coast to the heart of London; we should reckon the time from some point well on the other side of the water. Tactically, it is usually wise to keep the fighters well back, near the centre to be attacked, for there less chance of evasion is given to the raiders, and, also, the fighters can strike outwards when necessary. The depth of the defence will not be limited by the coast, and that is the most important point of all.

The possession of allies across the Channel would also increase the striking range of our bombers, which could refuel at some point much nearer to their objective than is, say, Hawkinge aerodrome. The prospect of seeing swarms of Blenheims, Battles, Wellingtons, and Whitleys arriving over his munition factories is calculated to have a very pacifying effect on any would-be aggressor.

The Channel remains, together with the Royal Navy, our sure guard against invasion by an army, and we must not forget that; but for air warfare it has become a nuisance, and its strategical abolition is a great contribution to the peace of the world.

THE DEVOURING SWARM. At first sight it is difficult to explain the hazy cloud in this Imperial Airways photograph of the Sudd Swamps, on the Nile near Malakal; actually it is a swarm of locusts in flight. This grim terrain, which lies on the route commonly taken by Cape record aspirants, was described recently by Flt. Lt. Tommy Rose in *Flight* as "really a shocking area."

The Outlook

A Running Commentary on Air Topics

Inexperienced Radio Operators

IN last week's issue we drew attention to the need for "organising safety" in bad weather transport flying, and more than a year ago we stressed the vital importance of the air W/T operator and complained of his relatively inadequate remuneration.

A writer in the correspondence columns on p. 598 of this issue makes no bones about the matter and says that "British airline W/T operators are a joke all over Europe . . ." and that some companies employ ". . . as operators, inexperienced youths—some of them straight from the wireless schools."

If this criticism can be substantiated—and we have no reason to doubt the fact that his statements are true, at least, in the case of one or two companies—then it is obviously a waste of breath to demand more and better ground facilities. Even if an inexperienced operator can be safe on the ground, where he can think and work in comfort and privacy, he is certainly not safe in the air, where his duties are at least as important in bad weather as those of the pilot.

The matter should be examined forthwith by those concerned at the Air Ministry.

Overseas Developments

WHEN the Foreign Office drew up a memorandum stating that British interests would not be harmed if Italy annexed Abyssinia (a document which was neatly copied and published in Italy), the writer evidently did not take into consideration the need for garrisoning the East African Colonies. With an Italian Air Force located in Ethiopia, it has become necessary for us to station squadrons in Kenya, and Sir Edward Ellington, Chief of the Air Staff, in his speech at the dinner of the Comrades of the Royal Air Forces, announced that this step would actually be taken. Doubtless the appointment of Air Chief Marshal Sir Robert Brooke-Popham as Governor of Kenya is also part of the same policy. It will be interesting to see if the air garrison of Kenya is to include fighter squadrons, as hitherto there have been no fighter units in any overseas Command. The reason for this was that there have been no European air units within striking distance of any of our overseas territories, but this no longer applies to East Africa.

The Chief of the Air Staff also announced that squadrons are to be stationed at Hong Kong, Penang and in Ceylon. That means a large extension of R.A.F. responsibilities, and doubtless the Far East Command will soon be raised in status. Hitherto it has only had an Air Commodore at its head, and now an Air Vice-Marshal would seem to be indicated. However, Air Commodore Tedder has only just taken over the Command, so that things will probably remain as they are for the present. It will take a little time to raise the squadrons, for the Metropolitan Air Force must first be brought up to full strength, and then aerodromes will have to be selected and made ready.

Ceylon, Penang, Hong Kong—if one glances at a map one sees how they are spread along the trade route to the Far East, amplifying and extending the importance of Singapore. In the past air operations at Hong Kong have mostly been against Chinese pirates, and aircraft off carriers have efficiently dealt with such matters. Now, in the present state of world tension, it would be folly not to have a shore-based air contingent at Hong Kong, and that contingent ought to be a strong one.

V.P. Progress

IT is a somewhat curious fact that, although Great Britain was among the very first nations to produce a workable mechanism for controlling the pitch of an airscrew, it was among the last of the great aircraft-producing nations to make use of the benefits which the v.p. airscrew can give.

As long ago as April 12, 1936, a paper by Dr. Hele-Shaw and Capt. T. E. Beacham was read before the Royal Aeronautical Society, describing the Hele-Shaw-Beacham hydraulic pitch control. Long before that, a v.p. airscrew with this type of mechanism had been built, tested at Farnborough both statically and spinning, and flight-tested on a Rolls-Royce Condor engine. The Gloster Aircraft Company arranged with Dr. Hele-Shaw to carry out further development work, and at the time of the lecture that work was already going forward.

More recently, the Gloster company, in conjunction with the Air Ministry, arranged to transfer the work of perfecting the mechanism to the Bristol Aeroplane Co., Ltd., and Rolls-Royce, Ltd. Details of the latest types of hub developed by these companies were published in *Flight* of May 9, 1935, and the Bristol airscrew has now passed successfully three type tests of fifty hours each. The difficulty experienced with earlier models, that of oil leakage, has now been overcome, and pilots report that the airscrew is very smooth in operation. Being of the controlled constant-speed type, the Hele-Shaw-Beacham v.p. airscrew possesses certain not inconsiderable advantages, relieving the pilot of extra work while affording him the opportunity to reset the speed to any desired figure at any moment. It is fitting that at the moment when this airscrew has proved itself we should remember with gratitude the man who had the original idea, even if others have contributed much to the perfecting of actual details.

Curiously enough, in this week's issue we describe and illustrate another v.p. airscrew, the Milner, designed by the man who has played such a prominent part in developing the Hele-Shaw.

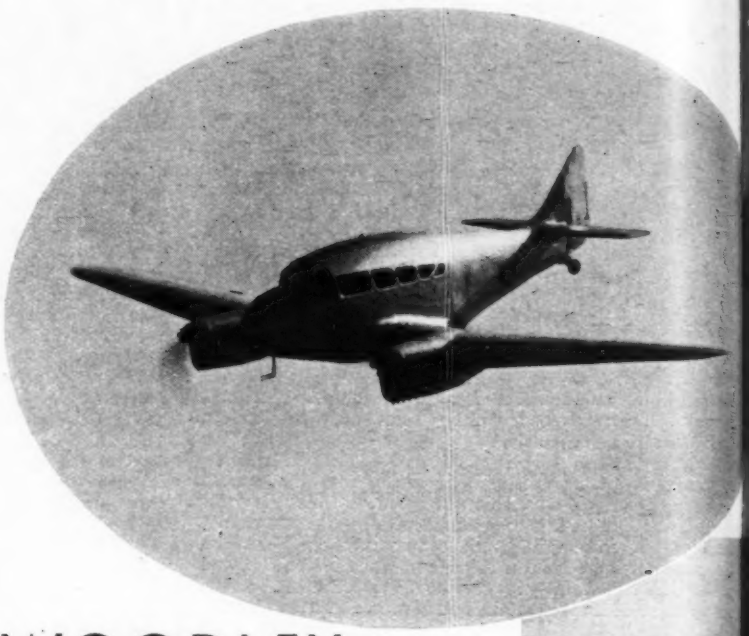
The Milner v.p. airscrew is based on different principles, but may well prove suitable for certain classes of aircraft, its simplicity and relatively low weight being points in its favour.

Some Talk of Alexander . . .

IF Lysander had not made a useful rhyme with Alexander would his name have been introduced into the song, "The British Grenadiers"? And if it had not come into that song, would the man in the British street ever have heard of Lysander? Would Thomas Atkins, in particular, have ever known the name which he frequently sings so lustily? Now the name will mean to him the Westland monoplane, which tells him what the enemy is doing on the other side of the hill, and as such the name may come home to him in a way it never has to past generations of Grenadiers.

Actually Lysander was the Spartan general who finally defeated the Athenians in the Peloponnesian War. Athens started the war as the great naval Power in Greece, while the Spartan infantry were the most formidable force of their kind in the ancient world. Lysander's great work was to raise a Spartan fleet and beat the Athenians in a naval battle, which brought the long war to a close. The Lysander aeroplane, however, is to confine its energies entirely to the help of land forces.

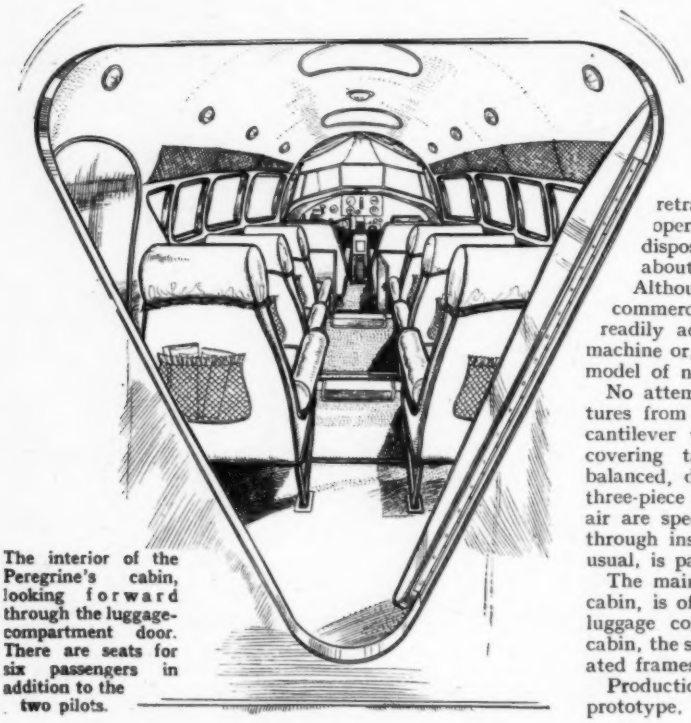
Advent of the Peregrine, the first Twin-engined Miles Type : A Light Transport to the Modern Formula : Two Gipsy Six IIs or Menascos



LATEST FROM WOODLEY

GENERALLY advanced design and the use of the effective Miles split trailing-edge flaps have conferred on the family of single-engined monoplanes produced by Phillips and Powis Aircraft, Ltd., some highly desirable features making for extraordinary performance, pleasant handling characteristics over the wide speed range, and economy of operation. The new Peregrine light transport monoplane has been endowed not only with the more beneficial features of its forebears, but is brought into line with the most modern practice by the inclusion of variable-pitch airscrews and a retractable undercarriage. For the commercial operator its virtues may be summarised as: 2,200 lb. disposal load carried for 562 miles at 160 m.p.h. on about 400 h.p.

The tapering line of cabin windows is one of the features which give the Peregrine such an attractive external appearance. On the right the large area of the flaps is seen to advantage.



The interior of the Peregrine's cabin, looking forward through the luggage-compartment door. There are seats for six passengers in addition to the two pilots.

Although conceived primarily as a civil type for commercial or private employment, the Peregrine is readily adaptable to serve as a twin-engined training machine or, with armament, as a military general-purpose model of no little merit.

No attempt has been made to introduce radical departures from standard Miles structural practice. The low cantilever wing has two spars with the Saro plywood covering taking drag and torsional stresses. Mass-balanced, differentially operated Frise ailerons and Miles three-piece split trailing-edge flaps operated by compressed air are specified. The rams for the flaps are accessible through inspection doors in the centre section which, as usual, is parallel in chord and is given no dihedral.

The main portion of the fuselage, which embodies the cabin, is of semi-monocoque construction, but aft of the luggage compartment, located immediately behind the cabin, the structure becomes a true monocoque with laminated frames and formers.

Production machines will be a foot longer than the prototype, the extra length resulting from a re-designed

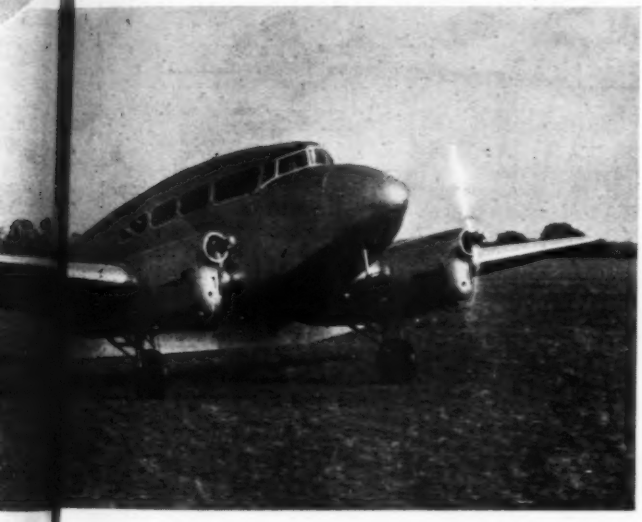
barrel-shaped nose portion forward of the front spar.

A particularly commendable feature is the provision of ample inspection facilities. The nose portion of the fuselage hinges on its starboard side and swings aside, revealing the controls, cable conduits and brake operating gear, and there are two downward-folding panels in the floor, followed by a series of small servicing doors in the fuselage bottom for the inspection of all moving parts. The hinges of these folding portions are concealed, leaving a perfectly smooth exterior.

Of orthodox layout and construction, the tail unit has a wooden, plywood-covered fin and tail plane and metal rudder and elevator, the latter surfaces incorporating trimming tabs.

The undercarriage is in two completely retractable portions, one beneath each engine nacelle. The retracting motion is a rearward and upward one and is effected by compressed air from a Dunlop system, which also supplies the wheel brakes. Lockheed Airdraulic struts are used not only for the main undercarriage, but for the tail wheel. A means of covering the gap admitting the wheels into each nacelle is being developed. The wheels are low-pressure, ball-bearing mounted Dunlops.

Power is derived from two of the new De Havilland Series II Gipsy Six six-in-line inverted air-cooled engines,

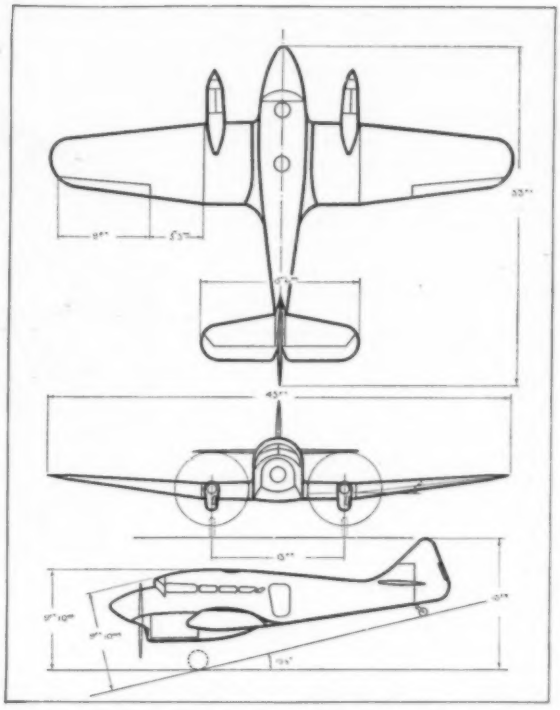


delivering a maximum of 205 h.p. each to De Havilland two-bladed, two-position variable-pitch airscrews of 7ft. 6in. diameter. These units are mounted in streamlined nacelles forward of the leading edge of the centre section. Their cowlings, incidentally, differ somewhat from those common on Series I engines, having, in place of the large outlet slot formed by the rear of the cowling, two comparatively small outlets and a pair of smaller louvres. Spinners for the airscrew hubs are available.

The oil tanks form the tail fairings of the engine nacelles, and fuel is carried, as usual, in wing tanks. Fuel consumption is given as 31 gall./hr., permitting a range of 562 miles.

Accommodation

The cabin is entered from the port side and is normally arranged to seat six passengers, the rear seats, nearest the door, being arranged to slide on rails to facilitate entry. The first and second pairs are mounted respectively on front and rear spars. Soundproofing and general upholstery are by Rumbold, and great attention has been paid to the comfort and convenience of passengers. Light luggage racks are fitted above each row of seats, and to each seat there is a lamp, ashtray and container for small articles.



The fine proportions of the Peregrine, despite its roomy cabin, are brought out in these G.A. drawings.

Immediately behind the cabin comes the luggage compartment, which is accessible from the cabin through a bulkhead door and from the exterior of the machine through a second door in the fuselage side.

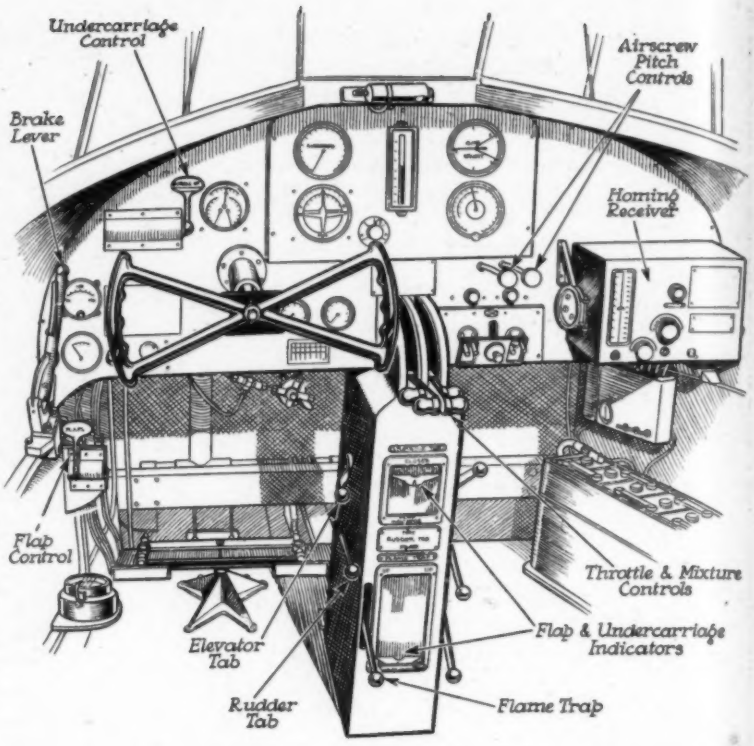
The door-locking arrangements are particularly ingenious, permitting a flush surface on the exterior, as indicated in the sketch on page 597.

A pair of Harley retractable landing lights is mounted in the wings, and the equipment includes standard Demec navigation lights and Rotax lights in the cabin and cockpit.

There are a number of usefully original features in the

MILES PEREGRINE
Light Transport Monoplane
Two D.H. Gipsy Six Series II (205 h.p. each).

DIMENSIONS	
Span	45 ft.
Length	33 ft.
Height	9 ft. 10 in.
Wing area	300 sq. ft.
Volume of cabin	218 cu. ft.
Volume of luggage compartment	25 cu. ft.
Max. height of cabin	5 ft. 3 in.
Length of cabin	12 ft. 8 in.
Max. width of cabin	4 ft. 6in.
WEIGHTS	
Tare weight	3,200 lb.
Disposable load	2,200-2,300 lb.
Gross weight	5,500 lb.
LOADINGS	
Wing loading	17.35 lb./sq. ft.
Power loading	12.7 lb./h.p.
PERFORMANCE	
Max. speed (sea level)	180 m.p.h.
Cruising speed (sea level)	160 m.p.h.
Landing speed (with flaps)	52 m.p.h.
Single-engine ceiling	5,000 ft.
Climb to 5,000 ft.	6.07 min.
Climb to 10,000 ft.	14.25 min.
Climb to 16,000 ft.	21¼ min.
Range at cruising speed	562 miles



A commendable feature of the Peregrine's cockpit layout is the central pillar housing the more important controls and indicators.

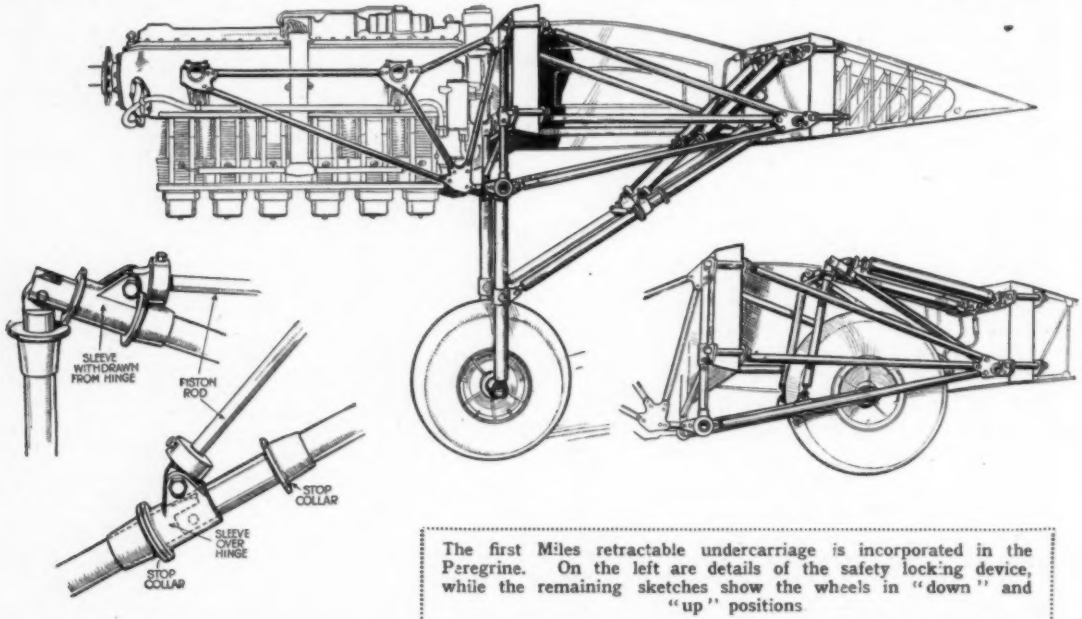
layout of the control cabin of the Miles Peregrine, even though allowance has usually to be made for necessary "jury-rigging" in the case of any prototype. In its present form the Peregrine is not fitted with dual control, but this will be optional on production models, which will also be arranged with a partition between the control cabin and the passengers' compartment. Both flying and auxiliary controls are of the Simmonds-Corsey type.

Most interesting of these control features is the way in which the secondary controls are arranged in a bank below the dash and between the two forward seats. At the base of the dashboard, in the centre, is the throttle and mixture control quadrant, while below, at the side of the centre column, are the elevator tab, rudder tab and controls for the Amal flame traps. On the face of this column are two easily read indicators, one for the flap and the other for the undercarriage position. In addition, a warning buzzer will be installed for the latter.

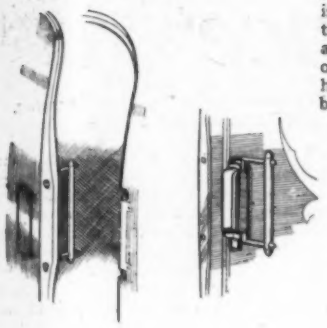
Both the undercarriage and the flaps are pneumatically operated from the same system as that used for the brakes; their respective controls are on the dash at the pilot's left. The airscrew pitch-changing controls are of the push-pull variety on the dash to the right of the central bank. On the right, too, in the case of the prototype, is the latest type of Radio Transmission Equipment receiver and homing set. The present instrument layout includes the normal instruments, of Smith's manufacture, with a Hughes' rate-of-climb indicator, as well as a Reid and Sigrist Gyorizon and liquid fore-and-aft level.

As in the case of the Miles Whitney Straight, the shaped Rhodoid screen is arranged with sliding sections in its main body so that both first and second pilots can obtain an "open-air" view in rain or bad visibility. The apertures are so placed that there is no direct airflow through them, and only a slight draught on either side of the direct line of vision. This draught would be very useful as an indirect means of ventilation in hot weather.

The major controls are of the normal type, though the spectacle control has no visible column in the ordinary sense of the term, the horizontal shaft sliding through



The first Miles retractable undercarriage is incorporated in the Peregrine. On the left are details of the safety locking device, while the remaining sketches show the wheels in "down" and "up" positions.



A flush exterior is preserved on the Peregrine by a special design of concealed door handle illustrated by these sketches.

the dashboard rather after the manner of that in the American Stinson. There is, consequently, no restriction to leg movement.

While at Woodley recently we had a chance of flying with the designer in the machine, both lightly and fully loaded. The acceleration provided by the D.H. v.p. airscrews is quite phenomenal, and the Peregrine was off the ground with a full load in something like eight seconds after a two-hundred-yard run. Although the stalling speed in this state is, with the flaps up, probably very little below 60 m.p.h., Mr. Miles climbed her at this speed, while the rate-of-climb indicator showed something in the region of 1,000 ft./min. At the time, the undercarriage was not retracted, and it is probable that this rate of climb could be considerably improved upon. For the same reason, the indicated maximum and cruising speed were of no interest, though the former was about 160 m.p.h.

As a matter of interest to those who are not accustomed to flame-trap controls, these are open at the take-off and closed at cruising r.p.m., or below, in coarse pitch, unless the induction temperature rises above 40 deg. C. In its present form the elevator tab trimmer will not quite hold the machine on full throttle and fine pitch, but certain minor modifications will be made to the tail unit of production machines.

It is possible to fly comfortably, and without loss of height on full load, with either throttle cut back, and the rudder bias will hold the turn in one direction. Some slight rudder pressure is necessary when turning around the running engine. At the stall, flaps down, the machine appears to have no peculiarities and shows no sign of dropping a wing—at least when the stall is made fairly gently, some aileron control remains even after rhythmic shudderings indicate that the airflow is breaking away.

With both the flaps and the undercarriage down, the approach is extremely steep, and the former are so efficient that, if the machine is brought in slowly, a little motor is advisable in order to extend the period of hold-off. On neither of the two landings did the machine come to rest much more than 150 yards from the boundary markers.

A version with Menasco B.6.S. engines will eventually be available, and will have the following performance (the speed figures in brackets relate to sea-level operation): Maximum speed, 194 m.p.h. (182 m.p.h.); cruising speed, 172 m.p.h. (162 m.p.h.); climb to 5,000ft., 4.76 min.; and climb to 10,000ft., 10.53 min.

AN APPRECIATION

A French Aviation Journal Pays Homage to the Merlin

IT is always interesting to see ourselves as others see us; nowhere more so than in aviation, with its possibilities of almost innumerable solutions of any given problem. For that reason it is felt that the comments of a writer in our French contemporary *Les Ailes* on the Rolls-Royce Merlin exhibited at the Paris Show will be appreciated.

"As usual," the French writer begins, "the Rolls-Royce stand is in the best taste; sober, with its horizontal lines and its beautiful wood panels, it sets off the choice mechanism of the Derby works. It is really a species of sanctuary where one goes to admire St. Merlin, the charmer canonised by the Air Ministry."

After mentioning the main points of the two Kestrels exhibited, the French commentator continues: "When we arrive before the chapel of the illustrious Merlin, Monsieur Golovine becomes dumb, or almost so. We are only permitted to learn that the Merlin weighs 600 kg. and develops 1,065 b.h.p. at its rated height, which, at a guess and according to present tendencies, may be put at approximately 5,000 metres.

"But if M. Golovine is dumb, we ourselves are not blind. Let us tell of what we discovered for ourselves. First of all, one striking thing: the cylinder head, the form of which does not at all resemble that of the Kestrel. There are doubtless four valves per cylinder, but certainly the form of the combustion chamber is different. The water or liquid outlet piping is disposed the opposite way around. For what reason has it been oriented towards the front? The reduction gear is of the same type as previously, but seems larger, stronger. There is a two-pitch Hamilton v.p. airscrew.

Supercharging 1,000 h.p.

"The supercharger is formidable in the matter of dimensions. It takes up the whole outline of the engine and even a little more. One imagines that the designers must have regretted not to be able to give it another ten centimetres in diameter. Certainly, it is not the rotor which occupies all this space. What then? Without any doubt use has been made of the guide vanes, making them as large as possible so as to avoid the gas being flung against the bottom of the volute casing and producing calories, to the great detriment of the efficiency of the supercharger and gas temperature, and consequently to the power of the engine.

"The supercharger of the Merlin is very similar to that of the Rolls R of the Schneider machines.

"The carburetter is of the vertical double type. Of entirely new design, it looks a formidable mechanism with lots of adjustments. The throttle control is connected to the ignition control. On the Kestrel the maximum advance is obtained at a normal speed of 2,600 r.p.m.

"Finally, on the back of the Merlin we find a marvellous florescence of accessories: oil pump for the retractable undercarriage, air compressor for the starter, vacuum pump, drives of all sorts and sizes for the rev. indicator, gun interrupter gear, and so forth. One is sorry to see these parasites breaking up by their apparent complication the beautiful lines of the Merlin. There is also on this side the drive for the hand starter and, vertically, the electric starter, while horizontally, at the level of the crankshaft, one finds a 500-watt generator.

"There you have what we had been able to discover on the Merlin. Certainly had our eyes been of the X-ray type, we should have had other cunning things to record. Unfortunately we are not yet so fitted, in spite of all our efforts."

Flt. Lt. Henry Bailey

IT is announced that Blackburn Aircraft, Ltd., have recently appointed Flt. Lt. Henry Bailey, R.A.F.O., A.M.Inst.C.E., A.F.R.Ae.S., as assistant test pilot to Flt. Lt. A. M. Blake, who has been chief test pilot since 1926.

Flt. Lt. Bailey became associated with aviation at a very tender age during the war, when he served as a boy wireless operator on board "zero"-type airships on anti-submarine reconnaissance work in the Channel. After the war he followed the engineering profession until he took a short-service commission in the R.A.F., in which he became a flying instructor.

In 1932 he left the Service and joined North Sea Aerial and General Transport, Ltd., with whom he has remained as an instructor at the Brough flying school. He has frequently been "lent" to the Blackburn Company to assist in test flying. Last summer he became interested in gliding, and during one week-end qualified for his A, B, and C licences at Sutton Bank. He is an A.1 C.S.F. instructor and holds both B licence and a second-class navigator's licence.

Correspondence

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters intended for publication in these columns.

THE PRIVATE OWNER'S IDEAL

THIS interesting correspondence has at any rate disclosed the existence of a class which has hitherto been neglected or ignored—the man who has something better to do with an aeroplane than "pub-crawling."

The average private owner seems to be in a position analogous to that of a man who keeps a car in a local garage in order to go visiting other local garages! Excellent as such establishments may be for adjustments, replenishments and repairs, few motorists would be content to look on them as the be-all and end-all of motoring—yet the chief use which people seem to have for flying is to go trapesing round from one club or municipal aerodrome to another.

Like Mr. Douglas Fawcett, I am afraid I want to get away to the mountains and lakes, the fjords of Norway and the islands of West Scotland. Unfortunately for the pilot the only horizontal oasis in these charming vertical deserts is only too frequently the lake. Surely the solution lies in the light amphibian, for which anything deep enough to float on and long enough to get off, is a potential aerodrome, as well as the usual places of refreshment, friends with fields and the beach.

Mayfield, Sussex. J. M. PART.

["Indicator," in *Flight* of June 4 last, suggested that there might be a demand for a private-owner amphibian.—ED.]

I MUST place on record my surprise at the slowness of makers to cater adequately for the prospective owner. As a person connected with or engaged in the motor trade for over thirty years, I find the obviousness with which history repeats itself rather amusing. Therefore, I ask: When will manufacturers realise:

(1) That all "prospects" are not of the scarlet-bereted, green-pullover type of "sport"?

(2) That of the said "prospects" few are millionaires? In fact, for the one person capable of or willing to disgorge anything from £1,200 to £2,000 for the privilege of being an owner there are at least a dozen waiting for the £800 family machine.

It was not the open two-seater "pneumonia trap" nor yet the big closed car that made motoring so popular. It was the small, cheap family saloon, and I go so far as to assert that the aeroplane provides a parallel case. The maker who sets out to produce in quantities, and at the right price, a plane giving the seating amenities of an 8 h.p. Ford (say total passenger load of 700-750lb.), will do well for himself, and there isn't the smallest doubt that it can be done.

Much has been written of late on the subject of fine standards in the matter of workmanship, materials and testing. All very true, so long as the issue isn't befogged and obscured; but the answer would appear to lie in the fact that quite successful adaptations of cheap car engines have been made (e.g., the V8 Ford) without any money being wasted on expensive fancy work. CECIL J. FARRELL.

Mullingar.

THE FLEET AIR ARM

I SEE that *Flight* is advocating that the Admiralty should be given complete control of all naval defence, including the aircraft which come under that heading. It would be a very difficult thing to define the meaning of naval defence, as distinct from air defence, in this case, although the naval people would presumably include, in addition to the aircraft carried by the fleet, all flying boat and coastal reconnaissance squadrons.

Many people are in favour of giving the Navy complete control of all aircraft which are carried with the fleet, and in effect this is nearly the state of affairs already. The danger of handing over the Fleet Air Arm lock, stock and barrel to the Admiralty is that it would be taken as a precedent for still further annexations, which would in turn lead to the splitting up of the Air Force and seriously reduce its power as our main striking force.

Many of the complaints made by the naval people about the control of aircraft are concerned with details of the administration, which should be fairly easily remedied. The deficiencies of the Fleet Air Arm, if any, have been chiefly due to our disarmament policy and lack of money; and those reasons would still hold good whether our aircraft were controlled by admirals or air marshals.

Aircraft design is still improving very rapidly, and the strategy and tactics of aircraft operation must also change as the potentialities of aircraft increase. The aeroplanes of to-day are at least 100 per cent. more efficient as offensive weapons than those of twenty years ago, whereas the battleship, by comparison, has improved very little. In order to make the most efficient use of our aircraft it is essential that they should be under the control of men who, by their training and experience, are able to realise to the fullest extent the present and future capabilities of air power.

The Admiralty have in the past shown a strong reluctance to admit the possibilities of new methods of warfare, of which the submarine is one example. The official naval history of the war says: "The Grand Fleet could only put to sea with an escort of nearly one hundred destroyers; no capital ship could leave its base without an escort of small craft; and the German U-boats hampered our squadrons to an extent which the most expert and far-sighted naval officer had never foreseen." (This hardly does justice to Admiral Sir Percy Scott, whose belief in the power of the submarine was not, apparently, shared by their Lordships of the Admiralty.) And although the Navy has at last, by force of circumstances, become really interested in aircraft, it still believes that a bomb-proof battleship can be built.

In view of the attitude of the senior members of the Senior Service towards new methods of warfare it would obviously be dangerous to put a rapidly-developing service such as the air arm under complete control of the Admiralty. And that is, presumably, one reason why every commission which has investigated the subject has come to the conclusion that the Air Force should be under separate control.

Walton-on-Thames. E. N. B. BENTLEY, A.F.R.Ae.S.

[In the days before aeroplanes existed coastal defence was a disputed point between the Navy and the Army, and it remains dubious now that there are three Services.

The argument about precedent is a dangerous one, as, pushed to its logical conclusion, it would bar all reforms. If a certain arrangement is bad it ought to be reformed, precedent or no precedent. We are unable to believe that there is any danger of the Air Force being split up, in the sense of ceasing to exist as a separate service.

That the Navy believes that a bomb-proof battleship can be built (we most sincerely hope that it is possible) hardly seems an adequate reason for maintaining dual control on board naval ships.—ED.]

A JOKE THAT IS NOT FUNNY

BRITISH airline W/T operators are a joke all over Europe. Any foreign control will, if asked, say plainly and exactly how dangerous a joke they can be.

However good radio sets may be, some airline companies know so little of how these sets should be used that they often employ, as operators, inexperienced youths—some of them straight from the wireless schools.

Letting amateur operators loose on aircraft is nothing short of criminal. At sea, where prompt and accurate radio communication is not half as vital as it is in the air, an operator is not permitted to take charge of any decent ship until he has had a minimum of three years' experience.

In the air raw operators are a terrible source of danger as well as a nuisance, and in the interests of civil aviation the Air Ministry should insist on previous experience as one of the major qualifications for the air W/T operator's licence.

Croydon. EX-MARINE.

GEORGE WASHINGTON A. VIATOR?

WE notice in the last paragraph of "A. Viator's" Croydon Notes, in *Flight* of November 19, that several trees are to be felled in the avenue leading to Hamble "by order of the Air Ministry."

We would like to point out that "A. Viator" is incorrect in his statement, as the Air Ministry has had nothing to do with the matter. The trees are our own property, and as such we are entitled to fell or lop them at our discretion. The assumption in his last paragraph is therefore not founded on fact.

Air Service Training, Ltd.
R. J. F. BARTON (Group Captain),
Commandant.

THE FOUR WINDS

ITEMS OF INTEREST FROM ALL QUARTERS

A WILFORD Gyroplane mounted on a float undercarriage has been delivered to the U.S. Navy.

Mrs. Isabella Munro, of Melbourne, celebrated her 102nd birthday by going up in an aeroplane.

Professor Jean Piccard has been experimenting at the University of Minnesota with a cellophane balloon.

An appeal for recruits to operate London's kite balloon barrage is likely to be made in the fairly near future.

A mimic air-raid on London will be televised on December 12. Territorial units will co-operate with the R.A.F.

F/O David Llewellyn, who plans to fly to the Cape and back in four days, hopes to leave just before Christmas.

The weight of the Rolls-Royce Merlin engine, the power of which has lately been given as 1,065 h.p., is 1,318½ lb.

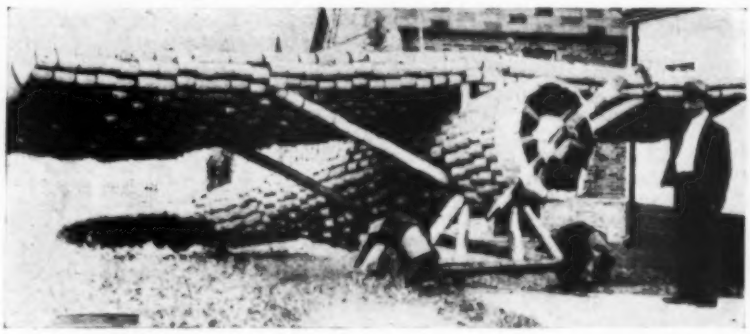
The first production type Boeing 299 bomber with four Cyclone G engines has been completed. It is the first of thirteen.

About twenty machines from H.M.S. *Glorious* were damaged by a violent gale which wrecked three hangars at Hal Far, Malta, recently.

One squadron of Vickers Vildebeest torpedo-bombers with Bristol Perseus sleeve-valve engines will soon be added to the strength of the R.A.F.

The U.S.S. *Enterprise*, the sixth aircraft carrier for the U.S. Navy, is scheduled for completion next year. She is 761ft. long and displaces 19,900 tons.

Earl Beatty recently flew in the Seversky demonstrator with Major Alexander Seversky and was very impressed, although he felt it was "too much aeroplane" for him to handle.



WHAT *CAN* THE MATTER BE? Of distressed-tin construction, with semi-(can)tilever wings of Aeroshell section, this new American machine has Vacuum-operated wheel brakes and oleo struts. Drip-feed lubrication is available without option since, as may have been deduced, oil tins are used throughout.

Twenty-five Years Ago

(From "Flight" of December 2, 1911.)

"Preparations are actively in progress at the Grand Palais for the Aeronautic Salon which is to open on the 16th inst. Naturally, a feature of the exhibition will be the machines which have proved so successful in the recent French military competitions, but apart from those there will be a comprehensive display of most of the other types with which any good results have been obtained."

ENTENTE CORDIALE. Mr. James Mollison and M. Edouard Corniglion-Molinier (a non-starting MacRobertson Race entrant) who left Croydon in the Transatlantic Bellanca, *The Dorothy*, last Sunday on a round trip to the Cape on which they hoped to break Mrs. Mollison's record for the double journey of eleven days. At 3 p.m. on Tuesday they reached Broken Hill, Rhodesia.

Arrangements are being made to feed oxygen into the passenger cabin of the new forty-passenger Douglas now under construction.

Last Tuesday evening the Air Ministry warned pilots not to fly near the burnt-out Crystal Palace, lest vibration from engine noise endanger parts of the structure still standing.

The Palace had few real links with aeronautics, though many balloon ascents were made from there in the early part of the century, and model aircraft competitions held.

Though no official announcement has been made, it may be taken as very probable that this year's Hendon Display programme will be of a somewhat lighter nature than in the past.

It is likely that one or more new "competitive" events, such as a landing competition, will be included, and that a "hardy annual," aerial skittles, will be seen and heard no more.

The Canadian Car and Foundry Company has contracted for the manufacturing rights in Canada of the Burnelli and is working in close contact with the Aircraft Research and Development Co.

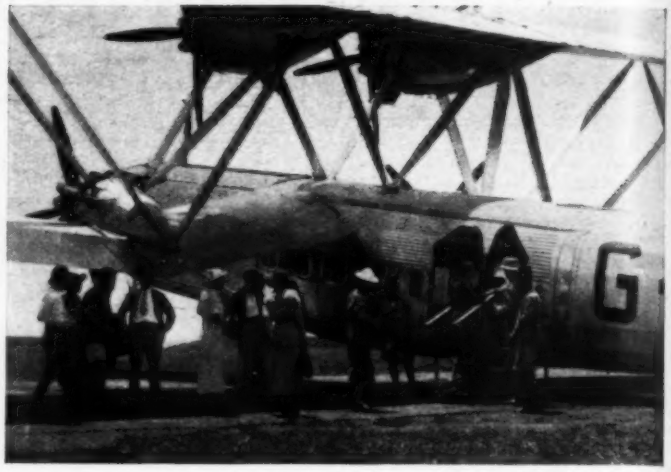
The Burnelli which Clyde Pangborn intends to fly to this country from Canada has aroused great interest over there and has been making cold-weather test flights. Pratt and Whitney Hornet engines are fitted.

Mollison and Corniglion-Molinier in the course of their Cape flight reached Broken Hill (Northern Rhodesia) shortly before 3 p.m., G.M.T., last Tuesday. They had made a forced landing on the banks of the Nile to investigate a leaking fuel tank.

Finding the leak inaccessible, they continued, losing fuel at the rate of a few gallons an hour. It was stated at Kisumu that they had abandoned the idea of making a record return flight.

BEHIND the SCENES in AIR TRANSPORT

The Second Brancker Memorial Lecture: Mr. D. H. Handover Deals with the Organisation Behind the Empire Air Services



IT may be remembered that, in the issue of February 13, *Flight* published an article on long-distance airline booking and on the manner of the solution of the intricate problems involved. On Monday of last week Mr. D. H. Handover, the traffic manager of Imperial Airways, delivered the second Brancker Memorial Lecture before the Institute of Transport, and he dealt very fully with this and co-existent problems in the organisation of Empire air services. Sir Henry Maybury, whose committee's report we have been eagerly awaiting for some considerable time, was in the chair. There was, surprisingly enough, no discussion after this extremely important lecture.

Mr. Handover opened by paying a tribute to the untiring energy of the late Sir Sefton Brancker in the cause of improved Empire communications.

Imperial Airways, he continued, were in a difficult position because foreign territory had to be flown over, and, even though it might not be necessary to land, permission still had to be sought from the country concerned.

They were not in the happy position of trans-continental operators in the United States, whose routes were within their own confines. Imperial Airways now operated over four continents and more than thirty countries with different languages, currencies, laws and customs.

The legal aspect of the operation of international air routes first came into prominence in the spring of 1910, when the first International Conference on Aerial Navigation was held in Paris. Arising out of this Conference the Aerial Navigation Bill of 1910 was drafted, the preamble to which ran that "the air above all parts of His Majesty's Dominions and the territorial waters adjacent thereto are inviolable." Subsequently there had been other conferences, culminating in the convention relating to the regulation of aerial navigation in 1919, which now formed the basis of international law on matters relating to air transport. The international law relating to air transport might be summed up in the statement that "every power has complete and exclusive sovereignty over the air space above its territory" and that "each contracting State undertakes in time of peace to accord freedom of inpocent passage above its territory to the aircraft of the other contracting States provided that the conditions laid down under the present Convention are observed."

At the present time any State had the right to refuse permission for the establishment of a regular air service over its territory without necessarily giving any reason for this step. Moreover, one State might discriminate against the services of another. Some of the most important countries had not signed the Convention so that they were a law unto themselves. Even when an air service had been established it enjoyed a precarious tenure.

Traffic revenue was divided under three main heads: Mails; passengers; and freight. Each of these necessitated the development of a technique peculiar to itself, yet the framework of traffic organisation had to have the elasticity to compass all three. Though the postal administrations were in direct contact with the air mail user, Imperials had an air mail department in their traffic organisation for dealing with enquiries and the dissemination of information. With passengers and freight they were in many ways a normal transport undertaking, offering a commodity which was retailed to the public through that versatile trade, the travel industry.

The co-operative use of air and surface transport could provide the solution to two deterrent factors to transport in general—namely, time and cost. Imperial Airways had been able to reach reciprocal arrangements with a number of steamship companies, so that passengers could obtain rebates to which they would normally have been entitled only if they had restricted their journey entirely to one or other method of transport.

As in all other forms of transport, the provision of the most suitable operating vehicle required the exercise of the "blessed gift of compromise," and the successful transport operator was the one skilled enough to compromise from the outset. Should he run at a high speed and hope that his consequent high operating costs would be met by traffic revenue, or should he estimate his revenue from traffic and adjust his speed so that his cost of operation would not exceed his revenue? Should he separate mails and passengers? Should he use land or marine aircraft? Would the terrain flown over and the ground equipment available enable him to run day and night or must he confine himself to hours of daylight? Should he plan for the future by providing more capacity in the one vehicle than he was likely to fill for some considerable time, or should he cope with growth of traffic by increase of vehicle units and frequency? If he decided to carry passengers, mail and cargo, should he give the utmost comfort to the passengers or view them as incidental to the main object of mail carriage—speed. In the judgment of the Imperial Airways the best compromise was the carriage of mixed loads at medium speed, at frequent intervals and at the cheapest rates. In addition they considered the comfort of passengers to be of paramount importance.

All Mail by Air

It was common knowledge that all letter mail intended for British destinations along the Empire routes shall, beginning next year, be carried wherever practicable by air and at no extra charge. This revolution in mail transport has necessitated a tremendous growth in the organisation of Imperial Airways and its associated companies. The magnitude of the work might be judged from the estimated mail to be carried—a matter of 16½ million ton-miles per annum, and these figures were by no means all-embracing. The tonnage of mail leaving England each week would be about twenty, and amounting to nearly two million letters a week.

The normal weekly services visualised in each direction were: London-Sydney, two; London-Singapore, three; London-Calcutta, five; London-Egypt, nine; London-Kisumu, three; and London-Durban, two, with provision for connections to China and West Africa. Although these would be normal schedules, Christmas periods would necessitate the use of about forty large aircraft, day and night, running seven services per week to Australia, nine to India, fifteen to Egypt, and five to Africa—for four weeks.

After prolonged examination the decision had also been reached that it was desirable to operate some of the main Empire services by means of flying-boats and some by land aircraft. A strong argument for the use of marine aircraft, particularly in the East and in Africa, was the limitation imposed on the increase in size of land aircraft by the capability of the surface of land aerodromes to bear their weight. There were other advantages in using flying-boats, such as the im-

proved performance at sea level. In general, fuel supplies on the seaboard are considerably cheaper.

The provision of trained personnel was one of the most difficult problems which confronted the operator. The business being a new one, the supply was limited. The commercial staff was generally brought into the company as trainees selected from applicants from public and secondary schools. They were required to possess strong individualities and a good standard of education, and were all examined by the National Institute of Industrial Psychology.

Making passengers comfortable in the air was a task to which many small details contributed. Space, fresh air, good ventilation, heating, good catering, an attentive steward service and, essentially, comfortable seating arrangements were needed. Imperial Airways had recently completed a chair of their own invention which was fitted as standard to the new flying-boats and landplanes. Its comfort and adjustability showed a marked improvement on anything of its kind yet in use; moreover, its weight was only 18lb. It was not always easy to make people comfortable on services which operated over countries in which the amenities were very limited and in such places the company had had to adopt the rôle of hotel caterer and establish rest-houses and trained staff.

Turning to that side of air line operation with which he was more immediately connected, Mr. Handover said that the traffic department was one which, though in its original sense was non-technical, had now a technique of its own. Of necessity the plan of a traffic department was an interwoven one. Every section of it was dependent upon another and the whole had to work closely with the engineering and the air departments so that schedules might both suit the technicians and be practicable for traffic requirements. Every aircraft was restricted in its "all-up weight." The main variable was in the distance to be flown, which governed the fuel and oil to be carried and therefore increased or decreased the weight available for the paying load. The available load on an aircraft must be divided between mail, passengers and freight. The air mail section had to estimate what weight would be required for mails. The booking office must be told the number of passengers up to which it may book on a certain service weeks in advance; then was known what weight remained available for freight; the whole must then be correlated and issued by the operations section in the form of allotments.

The Allotment System

These were issued from head office in graph form—the volume of allotment was obviously variable, not only in respect of capacity but in respect of traffic flow, to accord with the varying known factors to be met with on these long Empire routes throughout any operational year. The graphs show at sight (a) what accommodation might safely be sold in advance; (b) how much of such accommodation was allotted to the several "key" stations on the Empire routes; (c) the nearest "key" station to which lesser intermediate stations should apply for reservations; and (d) to whom unsold allotments were "forfeited" once any service had actually departed from a terminal or "key" station. This allotment scheme was thus an essential fundamental to the company's commercial operations, and any station on the lengthy Empire routes was able to obtain its required accommodation in a private code cable.

Mr. Handover then described Imperial Airways' system for checking the movements of aircraft all over the routes by maintaining charts to show the position of every unit of the Empire fleet. Such charts relied entirely upon a "movement cable code," which had been perfected over a period of ten years, giving (1) the name of the aircraft, (2) the movement and service, (3) the direction, (4) the next port of arrival, and (5) the time of departure. The sequence of letters was arranged so that even if any one letter in the group of five was mutilated the message could still be read correctly; and when two in five were mutilated they were able either to read it correctly or to see without doubt that mutilation had occurred.

By the use of an operating chart it was possible to plot scheduled services in advance, by means of broken or faint lines, and as sections of these services were operated, to fill in the broken lines or to superimpose on them lines of distinctive colours. Thereby it was not only apparent that the services were running, and to what degree of regularity they were running, but also made it possible to see at a glance what particular aircraft operated a particular service, by the simple process of distinguishing each unit by a different colour. Examples of charts were then thrown on to the screen and the lecturer explained the system in greater detail.

The first step in scheduling the operation of a new route was to decide how long the journey would take. This would depend on the cruising speed of the aircraft, prevailing wind conditions, and the number of hours per day available for flying. At present no sleeping accommodation is used on the aircraft, and in the hypothetical operations passengers must spend each night at one of the places on this route, with the result that the number of flying hours per day was limited to the hours between sunrise and sunset. Another factor greatly affecting schedules was the variation of local standard time as compared with Greenwich mean time. Having allowed for these different factors the traffic department determined in association with the air department the period of time required to complete the journey. The next decision to make was the day of the week upon which the service should start. An important percentage of the load was mail, and where possible the convenience of the postal authorities was met. Another aspect, too, could not be ignored, and that was the overlapping of night-stops at rest-houses, since two loads of passengers cannot always be accommodated.

The I.A.T.A.

Turning to the matter of tickets and documents, Mr. Handover said that the diversity of the company's legal obligations was only equalled by the complexity of the legal requirements, and it was obvious to all operators of air liners crossing or landing in foreign territory that unification of these frequently conflicting national laws was imperative if international air transport was to progress. In 1919 Sir Sefton Brancker attended and took the chair at the first meeting of what was now the International Air Traffic Association. This association, which had a permanent office in The Hague, was not concerned with tariffs, running schedules or operations but existed to deal with matters of common interest to all operators—such as conditions of transport, through routing and documenting, standard rules of procedure and kindred subjects. One of the first problems to be faced was the standardisation of conditions of transport and the I.A.T.A. took a considerable part in the drafting of the Convention of Warsaw, which set out to achieve that object. Up to March, 1936, twenty-one countries had ratified the Convention, though even now a number of countries had not, and the ridiculous position can exist whereby the carrying company had different legal obligations to passengers in the same vehicle dependent upon whether or not the carriage was legally international.

The ticketing of a passenger and his baggage on a long-distance route was by no means the simple procedure which some other transport operators were able to adopt. At present air transport was bound, on international journeys, to deliver a ticket containing certain compulsory particulars. These were the place and date of issue, the places of departure and destination, the name and address of the carrier or carriers, the name of the passenger and the amount of the fare, and the agreed stopping places, together with a statement that the carriage was subject to the rules established by the Convention of Warsaw. In addition, mention must obviously be made of the date and service for which the ticket is valid. These requirements necessitated a good deal of clerical work.

Documentary Evidence

In this, the air transport company was very little worse off than the marine operator, but considerable divergence was seen between the two in the arrangements for carrying baggage. In a ship, none of the baggage was documented provided it was accompanied by a passenger, and in a British railway train a passenger could take a quantity in his carriage without it being entered on any document, and more in the luggage van, and possession of this could be obtained without production of a receipt. Air transport operators generally were compelled to take all baggage from their passengers and give a baggage check in exchange, which, again by law, had compulsory particulars included in it.

As regard freight the provisions of the Convention were even more complex. No fewer than sixteen separate particulars were laid down as being required in respect of every consignment. The omission or incorrect entry of even one of these details might, in certain circumstances, seriously affect the liability of the air company. In addition to these sixteen particulars, there were almost as many again required by the air companies themselves for accounting and suchlike, and by the Customs and other authorities.

On the new Empire flying-boats experiments were at this moment in progress with a scheme for the carriage of a member of the traffic staff. Each craft was equipped with a small office and carried a "flight clerk" whose duties were broadly analogous to those of a purser in maritime practice. By this means it was hoped to make each ship a self-contained unit.

HERE and THERE

News of the Latest Developments in the Industry and Elsewhere

Seventy-ton Flying Boats?

NEXT Thursday, December 10, Mr. A. Gouge, B.Sc., F.R.Ae.S., chief designer to Short Brothers, Ltd., will lecture before the R.Ae.S. on "Recent Progress in the Design of Civil Flying Boats."

Mr. Gouge will show the effects of various characteristics on the performance and construction of the civil flying boats for which he has been responsible. In particular he draws attention to the great importance of high wing loading—up to 45 lb./sq. ft.—with the resultant improvements in cruising speed, range, economy of operation and gain in efficiency both from the flying point of view and during severe weather conditions at moorings. The author expresses the opinion that there are no problems to be solved in producing boats double the weight of the present Empire boats, and that such craft will be a necessity for operating services over long stretches of water.

He visualises boats taking off at speeds exceeding 100 m.p.h., of 160,000 lb. all-up weight, and 40 lb./sq. ft. loading, and adds, "it is difficult to foresee what will be the ultimate limit of wing loading."

The lecture will be illustrated and will be given in the lecture hall of the Royal Society of Arts, 18, John Street, Adelphi, London, W.C.2, at 6.30 p.m. Non-members will be admitted only by ticket obtained through a member.

Comradeship

THAT the personnel of the proposed London kite balloon barrage would be organised more or less on Auxiliary Air Force lines, and would be recruited partly from those above the usual military age, was disclosed by Air Chief Marshal Sir Edward Ellington, Chief of Air Staff, speaking at the sixth annual reunion dinner of the Comrades of the Royal Air Forces Association in London last Saturday.

Sir Edward was replying to the toast of the Royal Air Force, and he gave his audience—an impressive one of 500-odd members of the Association—a masterly summing-up of the progress of the expansion scheme, both in regard to aircraft and personnel. In the case of the latter the greatest problem was to obtain skilled men, and one of the first steps that had been taken was to ask men who had left the Service to re-enlist; some 1,200, 500 of whom were skilled, had already done so.

Summing up his remarks on expansion, Sir Edward said "many of us regret the necessity for it, but it has been forced upon us by the action of others."

Mr. H. James, M.M., M.S.M., who proposed the toast to which Sir Edward had replied, told some amusing anecdotes of his own days in the air arm as long ago as 1912. In giving the toast he coupled with it the names of Sir Edward Ellington and Air Chief Marshal Sir Robert Brooke-Popham, who was unfortunately unable to be present.

Other speakers included A.V.-M. C. A. H. Longcroft, Air Comdre. B. C. H. Drew (chairman of the Association). A.V.-M. Sir Philip Game, Mr. Turberville, Mr. J. R. Thomas, and Mr. C. G. Grey.

During the course of the evening a cup presented by the Mayor of Wandsworth and awarded for all-round efficiency and zeal, was received by Lord Sempill on behalf of the South London Branch of the Association.

It is, perhaps, not generally realised that the Comrades of the Royal Air Forces Association is open to serving members, and new members are constantly being recruited as new stations are established; membership is of the order of 7,000.

During the evening a reply was read from His Majesty the King, to whom loyal greetings had been sent.

Hawker-Siddeley Aircraft

AT the first general meeting of the Hawker-Siddeley Aircraft Co., Ltd., held on May 25, Mr. T. O. M. Sopwith, chairman of the company, said the board recommended the payment, out of net profits amounting to £378,000, of a cash dividend of 30 per cent., less tax, on the first 4,000,000 ordinary shares, and a bonus of one fully-paid ordinary share for every ten. Mr. Sopwith explained that dividends from subsidiary companies included a loan of £300,000 to Hawker Aircraft, Ltd., for extensions. He also mentioned that the directors had under consideration the question of making an offer for that portion of the Hawker company's ordinary capital not at present owned by Hawker-Siddeley Aircraft. Mr. Sopwith concluded by recommending that a bonus of £5,000 should be allocated for distribution among employees, and that employees should be given an opportunity to acquire 20,000 of the unissued ordinary shares at par. Mr. H. K. Jones and Mr. H. A. Meredith were appointed directors of Hawker-Siddeley Aircraft.

Mr. H. K. Jones.

It may be explained that the subsidiary companies are Armstrong-Siddeley Development Co., Ltd., Armstrong Siddeley Motors, Ltd., Sir W. G. Armstrong Whitworth Aircraft, Ltd., A. V. Roe and Co., Ltd., and Air Service Training, Ltd.

The appointments of directors result in Mr. Sopwith being chairman of all subsidiaries; Mr. F. S. Spriggs is managing director of all subsidiaries and of Hawker-Siddeley Aircraft; Mr. R. H. Dobson is on the board of A. V. Roe and Co., Ltd.; Mr. A. J. Austin and Mr. C. S. Oliver are on the board of Armstrong Siddeley Motors, Ltd.; and Mr. H. K. Jones is on the boards of all subsidiaries and is general manager of the Hawker-Siddeley Aircraft Co., Ltd. There is no truth in the rumour that in future St. James's Square will be known as St. Jones's Square!

Forthcoming Events

December 3. Herts and Essex Aeroplane Club: Annual Dinner and Dance, Park Lane Hotel, London.
December 3. R.A.F. Flying Club: Annual Ball at Grosvenor House, London.
December 9. Royal Society of Arts Lecture: "Artificial Resins," by Mr. H. V. Potter. Royal Society of Arts, John Street, Adelphi, 8 p.m.
December 10. R.Ae.S. Lecture*: "Civil Flying Boats," by Mr. A. Gouge.
December 15. R. Ae.S. Students' Section Joint Lecture with I.A.E. and I.P.T.: "Fuels for Aero Engines," by Mr. C. H. Barton. S.M.M.T., 83, Pall Mall, London, 7 p.m.
December 17. R.Ae.S. Lecture*: "Profile Drag," by Prof. Melville Jones.
December 17. R.Ae.S. (Coventry Branch) Lecture: "The Queer Side of Flying," by Capt. J. Laurence Pritchard. Armstrong-Siddeley Canteen, 8 p.m.
December 18. London Aeroplane Club: Dinner and Dance, Park Lane Hotel, London.

1937
January 14. R.Ae.S. Lecture*: "Magnesium Alloys," by Dr. C. H. Desch.
January 28. R.Ae.S. Lecture*: "Plastic Materials," by Dr. N. A. de Bruyne.
February 3. Royal United Services Institution Lecture: "The Anti-Aircraft Defence of Great Britain," by Maj.-Gen. R. H. D. Thompson.
February 5. Cinque Ports Flying Club: Annual Dinner and Dance.
February 10. Yorkshire Aviation Services: Annual Ball, Grand Hotel, Harrogate, 8 p.m.
February 11. R.Ae.S. Lecture*: "The Automatic Pilot," by Mr. F. W. Meredith and Mr. P. A. Cooke.
February 17. Royal United Services Institution Lecture: "Air Force Co-operation in Policing the Empire," by Air Comdr. C. F. A. Portal.
February 18. R.Ae.S. Lecture*: "Compression Ignition Engines," by Mr. A. H. R. Fedden.
February 18. Civil Aviation Service Corps: Dance, First Avenue Hotel, London.
February 25. R.Ae.S. Lecture*: "Power Measurements in the Air," by Mr. N. S. Muir.
February 26. Brooklands and Associated Clubs: Dinner and Dance, May Fair Hotel, London.

* All R.Ae.S. lectures take place at the Royal Society of Arts, 18, John St., London, W.C.2, at 6.30 p.m. Admission is by ticket obtainable through a member.

THE ROYAL AIR FORCE

SERVICE NOTES AND NEWS — AIR MINISTRY ANNOUNCEMENTS

A POLITICAL APPOINTMENT

The Rt. Hon. Sir Philip Sassoon, Under-Secretary of State for Air, has appointed Mr. Stuart Russell, M.P. (Lancaster, Darwen), to be his Parliamentary Private Secretary.

THE LYSANDER AEROPLANE

The name Lysander has been chosen for the Westland Army Co-operation monoplane, and a substantial order for this type has been placed by the Air Ministry.

EXTENSIONS OF SERVICE

The undermentioned officers have been selected for retention on the active list as indicated:—

PERMANENT OFFICERS

To be retained to age 50

Sqn. Ldr. Ian Cullen, M.B.E., A.F.C.

To be retained to age 48

Sqn. Ldrs. Cuthbert Caumont Bazell, Joseph Blackford, Reginald Morville Davy, Arthur Hyde Flower, Harry King Goode, D.S.O., D.F.C., Harvey Lancelot Macro, D.F.C., A.F.C., and George Oswald Venn.

To be retained to age 45

Flt. Lts. Frederick Korsten Damant, D.F.C., and Robert Leslie Edyard.

OFFICERS RETAINED IN THE SERVICE TO COMPLETE TIME FOR RETIRED PAY

To be retained to age 55

Sqn. Ldrs. Albert Edward Case and Louis James Chandler, M.B.E.

MEDIUM SERVICE OFFICERS—SERVICE TO BE EXTENDED TO COMPLETE ELEVEN YEARS

Flt. Lts. Leslie Vincent Bennett, M.C., Duncan Bassett McGill, Walter Roy Monro Higgs, Frederick William Murison, and Geoffrey Fox Overbury.

SHORT SERVICE OFFICER—SERVICE TO BE EXTENDED TO COMPLETE SEVEN YEARS

Flt. Lt. Thomas Henry Lee Nicholls.

SHORT SERVICE OFFICERS—SERVICE TO BE EXTENDED TO COMPLETE SIX YEARS

Flt. Lts. Hugh Vaughan Horner and Roger Hargreaves Maw.

MOVES CANCELLED

No. 16 (Reconnaissance) Group and No. 17 (Training) Group will remain temporarily at Lee-on-the-Solent when they take over executive command on January 1, 1937. The moves to Bircham Newton and Calshot have been cancelled.

MOVE OF NO. 30 (BOMBER) SQUADRON

No. 30 (Bomber) Squadron has moved from Mosul to Dhibban, where it will be permanently located. Correspondence should be addressed to: No. 30 (Bomber) Squadron, British Forces in Iraq, Dhibban, Iraq.

BOMBING RANGES

The bombing range at Dalgety Bay is being converted to provide general facilities for high-altitude bombing during the hours of daylight only, by units using practice bombs. The range is administered by the C.O., R.A.F. Station, Donibristle.

A high-altitude practice bombing range has been constructed at Landguard Fort, Felixstowe, and may now be brought into general use, without bye-laws, during the hours of daylight only. The range is administered by the C.O., Marine Aircraft Experimental Establishment, Felixstowe.

FLYING ACCIDENT

The Air Ministry regrets to announce that L.A/C. John Hogg and L.A/C. Harry Weale lost their lives in an accident which occurred near Corby, Lincolnshire, on November 27, to an aircraft of No. 7 Flying Training School, Peterborough. L.A/C. Hogg was the pilot of the aircraft and L.A/C. Weale the passenger.

EDUCATIONAL SERVICE

It has been decided that the status of the education branch shall be raised to that of a directorate and that Mr. W. M. Page, C.B.E., M.A., Educational Adviser at the Air Ministry, shall have the status and title of Director of Educational Services.

It has also been decided that the post held by the officer who acts as immediate deputy at the Air Ministry to the Director shall be raised to the status of principal education officer, and Mr. J. A. Taylor, M.Sc., has been promoted with effect from October 1, 1936, to fill this appointment.

The following other promotions in the Royal Air Force Educational Service have recently been made:—Lt. Col. R. K. Pillers, O.B.E., B.Sc., M.I.A.E., Education Officer, Grade I, Headquarters, No. 24 (Training) Group. Mr. F. L. D. Davies, B.A., B.Sc., Education Officer, Grade I, Air Ministry. Capt. V. G. F. Kelly, B.Sc., Education Officer, Grade II (acting), Headquarters, Training Command. Major J. C. Booth, B.Sc., Education Officer, Grade I, Headquarters, Bomber Command. Mr. A. G. Boycott, B.A., Education Officer, Grade II, Headquarters, Bomber Command. Lt. Col. E. T. Rees, D.S.O., M.C., Secretary, Air Force Officers' Employment Association, previously Education Officer, Grade II, placed on a special scale of salary applicable to this appointment. Major B. Steel, M.C., B.A., Education Officer, Grade I, Headquarters, Coastal Command. Major G. Lees, O.B.E., A.R.C.S., A.M.I.C.E., Education Officer, Grade I, No. 3 Apprentices Wing, No. 1 School of Technical Training (Apprentices). Lt. H. G. Morcom, B.Eng., A.M.I.E.E., A.F.R.Ae.S., Education Officer, Grade II, No. 3 Apprentices Wing, No. 1 School of Technical Training (Apprentices). Capt. R. B. Garrard, B.Sc., Education Officer, Grade II, No. 1 Apprentices Wing, No. 1 School of Technical Training (Apprentices). Capt. B. A. Smith, M.A., acting Principal Education Officer, Electrical and Wireless School.

". . . AND SUCH GREAT NAMES." The Westland Army Co-operation monoplane, now named the Lysander. (*Flight* photograph.)

VACANCIES FOR APPRENTICE CLERKS

The Air Ministry announces:—

—A substantial number of vacancies will shortly occur for well-educated boys to enter the Royal Air Force as Apprentice Clerks. This is a career which may appeal to many boys who are attracted to Service life and wish to travel abroad but have no liking for a mechanical trade. Applications should be made to the Air Ministry not later than January 1, 1937. Candidates must be in possession of an approved school certificate and be between the ages of 15½ and 17¼ on January 1. Full information (A.M. Pamphlet 9) may be obtained from the Inspector of Recruiting, Royal Air Force, Victory House, Kingsway, London, W.C.2.

Successful candidates undergo a thorough course of training in clerical duties during their first eighteen months' service. Special

attention is given to their general education and to physical training. Full opportunities are provided to take part in games and exercise in the open air and in the social activities of their unit. Whilst undergoing training apprentices receive pay of 7s. weekly during the first year and 10s. 6d. weekly until they both qualify and have reached the age of 18. Their food, outfit, and accommodation are provided by the Service. Subsequently pay varies from 21s. to 31s. 6d. a week according to the degree of success attained at the passing out examination. Opportunties occur later for advancement in rank with increased rates of pay.

All apprentice clerks have an opportunity to volunteer for training as airman pilots, and those ultimately selected for flying duty are employed for at least six years on such duty before returning to clerical employment. Permanent commissions in the R.A.F. may be granted to airman pilots who are recommended as being specially qualified, and a limited number of permanent commissions may be granted in the Accountant or Equipment Branches to clerks attaining the rank of warrant officer. Apprentice clerks are attested for twelve years' regular Air Force service from the age of eighteen. At the age of thirty they return to civil life, but will normally be given an opportunity of entering the Royal Air Force Reserve and of drawing a gratuity of £100. A limited number may be permitted to re-engage to complete twenty-four years' service, thus qualifying for pension.

ROYAL AIR FORCE GAZETTE

London Gazette, November 24, 1936

General Duties Branch

F/O. J. H. Hill is promoted to the rank of Flight Lieutenant (November 1).

The following Pilot Officers are promoted to the rank of Flying Officer on the dates stated:—G. W. Peel (seniority July 1, 1935) (April 1); D. M. H. Craven, L. D. Dadswell, J. R. A. Embling, A. R. Fane de Salis, A. Foord-Kelcey, T. N. K. Walker (seniority January 1) (April 1); A. H. Donaldson (October 16); K. G. Stodart (October 30); M. Hallam (November 3).

Flt. Lt. J. H. Woodin is placed on the half-pay list, Scale B, from October 20 to 22, inclusive. (Substituted for notification in the *Gazette* of November 17): Sqn. Ldr. J. V. Read, M.B.E., is placed on the retired list (November 23); Sqn. Ldr. J. F. Gordon, D.F.C., is placed on the retired list at his own request (November 25); Flt. Lt. R. Macfarlan (Supplementary List) is transferred to the reserve, Class C (November 18); Lt.-Cdr. the Hon. H. M. A. Cecil, O.B.E., R.N., Squadron Leader R.A.F., relinquishes his temporary Royal Air Force commission (November 2).

The following Acting Pilot Officers on probation relinquish their short service commissions on account of ill-health on the dates stated:—P. J. Young (November 18); A. W. M. Street (November 24).

Chaplains Branch

The Rev. J. J. Roche is granted a short service commission with the relative rank of Squadron Leader with effect from and with seniority of November 13.

Erratum

In the *Gazette* of November 17. For Neville Barker-Simson read Lawrence Barker Simson.

ROYAL AIR FORCE RESERVE

Reserve of Air Force Officers

General Duties Branch

F/O. D. C. Evemy relinquishes his commission on completion of service and is permitted to retain his rank (June 29); F/O. K. C. T. Marshall relinquishes his commission on completion of service (July 15, 1935).

AUXILIARY AIR FORCE

General Duties Branch

No. 500 (COUNTY OF KENT) (BOMBER) SQUADRON.—F/O. W. K. Le May is promoted to the rank of Flight Lieutenant (October 19).

No. 610 (COUNTY OF CHESTER) (BOMBER) SQUADRON.—The following are granted commissions as Pilot Officers:—E. B. B. Smith (September 22); A. R. J. Medcalf (September 23).

General List

Sqn. Ldr. J. A. C. Wright, A.F.C., T.D., D.L., M.P., is appointed to the General List in the rank of Wing Commander on relinquishing his commission in the Auxiliary Air Force Reserve of Officers (June 1); Sqn. Ldr. A. Douglas-Hamilton, Marquess of Douglas and Clydesdale, A.F.C., M.P., is appointed to the General List in the rank of Wing Commander on relinquishing command of No. 602 (City of Glasgow) (Bomber) Squadron (September 2); Sqn. Ldr. R. G. Shaw, D.F.C., is appointed to the General List in the rank of Squadron Leader on relinquishing his commission in the Auxiliary Air Force Reserve of Officers (July 1); Flt. Lt. A. D. McNab is appointed to the General List in the rank of Flight Lieutenant on relinquishing his commission in the Auxiliary Air Force Reserve of Officers (August 1).

AUXILIARY AIR FORCE RESERVE OF OFFICERS

General Duties Branch

The following relinquish their commissions on the dates stated:—Sqn. Ldr. J. A. C. Wright, A.F.C., T.D., D.L., M.P. (June 1); Sqn. Ldr. R. G. Shaw, D.F.C. (July 1); Flt. Lt. A. D. McNab (August 1).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Group Captain.—A. J. Miley, O.B.E., to Special Duty List; on appointment as Air Attache, Buenos Aires, vice Group Capt. K. R. Park, M.C., D.F.C., 10.11.36. J. C. Russell, D.S.O., to R.A.F. Station, Scampton; to command, 16.11.36.

Wing Commanders.—J. C. P. Wood, to R.A.F. Station, Aldergrove; to command, vice Group Capt. J. C. Russell, D.S.O., 16.11.36.

Squadron Leaders.—J. Bradbury, D.F.C., to Headquarters, No. 11 (Fighter) Group, Uxbridge; for Auxiliary Air Force Liaison duties, 16.11.36. G. H. Russell, D.F.C., to Headquarters, R.A.F., Middle East, Cairo, Egypt; for photographic duties, 13.11.36. E. C. Dearth, to R.A.F. Depot, Middle East Aboukir, Egypt; for Engineer duties vice Sqn. Ldr. E. Burton, 13.11.36. R. Y. Eccles, to No. 23 (Fighter) Squadron, Biggin Hill; to command, 16.11.36.

Flight Lieutenants.—J. J. Owen, to Headquarters, No. 23 (Training) Group, Grantham, 11.11.36. G. I. L. Saye, A.F.C., to R.A.F. Station, Bircham Newton, 11.11.36. G. J. L. Read, to Central Flying Training, Upavon, 11.11.36. L. F. Brown, to No. 3 Flying Training School, Grantham, 11.11.36. W. P. Welch, to No. 7 Flying Training School, Peterborough, 11.11.36. H. Broadhurst and C. S. Moore, to No 4 Flying Training School, Abu Sueir, Egypt, 13.11.36 E. J. Laine, to No. 47 (Bomber) Squadron, Khartoum, 13.11.36. W. S. Reed, to No. 216 (Bomber Transport) Squadron, Heliopolis, 13.11.36. N. C. Singer, to No. 2 Armoured Car Company, Ramleh, Palestine, 13.11.36. A. F. Britton, to No. 47 (Bomber) Squadron, Khartoum, 28.10.36. L. A. Cubitt, to No. 216 (Bomber Transport) Squadron, Heliopolis, 26.10.36.

Flying Officer.—R. C. Crawford, to No. 9 Flying Training School, Thornaby, 16.11.36. D. Finlay, to R.A.F. College, Cranwell, 3.11.36.

Pilot Officer.—R. I. Jones, to No. 3 Flying Training School, Grantham, 10.11.36.

Acting Pilot Officers.—The undermentioned are posted to No. 7 Flying Training School, Peterborough, with effect from 14.11.36:—A. F. Barber, H. A. Bethune, T. C. Brock, P. Campbell, J. N. G. Carter, J. F. Chandler, T. V. G. Clarke, W. G. Clouston, B. A. Coventry, A. G. Craig-Brown, G. V. W. Davies, G. F. Dean, D. Devoto, L. J. Fry, J. C. Hamilton, F. B. Harris, F. Hume, G. H. B. Hutchinson, C. S. Keary, J. C. G. Macnab, G. R. Magill, J. E. Mahony, D. P. Marvin, D. C. Mauger, J. A. Heade, D. S. Munro, J. B. Murray, T. G. Pace, E. J. C. Richardson, G. S. P. Rooney, H. S. Shaw, G. Smith, R. E. G. Van Der Kiste, A. D. Watson, N. V. B. Wilmshurst and G. F. Witney.

Equipment Branch

Flight Lieutenants.—C. J. Nobbs, to R.A.F. Station, Ismailia, Egypt, 13.11.36. W. T. Lewis, to No. 216 (Bomber Transport) Squadron, Heliopolis, 30.10.36. H. J. Young, M.B.E., to No. 1 Stores Depot, Kidbrooke, 16.11.36.

Flying Officer.—S. W. Thomas, to R.A.F. Depot, Uxbridge, 16.11.36.

Accountant Branch

Flight Lieutenant.—C. V. Mears, to No. 47 (Bomber) Squadron, Khartoum, 13.11.36.

Commissioned Engineer Officers

Flying Officers.—W. J. Loughhead, to R.A.F. Depot, Middle East, Aboukir, Egypt, 13.11.36. H. Hipwood, to R.A.F. Station, Calafrana, Malta, 16.11.36.

Medical Branch

Wing Commander.—T. J. D. Atteridge, to Headquarters, R.A.F., Aden; for duty as Deputy Principal Medical Officer (Hygiene), 9.11.36.

Flight Lieutenant.—S. R. C. Nelson, to No. 47 (Bomber) Squadron, Khartoum, 21.10.36. A. W. Callaghan, to R.A.F. General Hospital, Hinaidi, Iraq, 12.10.36.

Dental Branch

Flight Lieutenant.—F. F. Kennedy, to R.A.F. Depot, Middle East, Aboukir, Egypt, 13.11.36.

Chaplains Branch

Revd. P. J. Macken, to No 4 Flying Training School, Abu Sueir, Egypt, 13.11.36. Revd. A. J. Potts, to Headquarters, R.A.F., Palestine and Transjordan, Jerusalem, 13.11.36. Revd. J. Firth, M.C., and W. R. Marsh, B.D., to Headquarters, Bomber Command, Uxbridge; for duty as Staft Chaplains, 1.11.36. Revd. J. J. Roche, to R.A.F. Depot, Uxbridge; on appointment to a short service commission, 13.11.36.

R.A.F. Units Visited

No. 48 (GENERAL RECONNAISSANCE) SQUADRON

By
Major F. A. de V. ROBERTSON, V.D.

Coastal reconnaissance aircraft normally wish to see and not to hide themselves, but sometimes they practise navigation above the cloud banks
(*Flight* photograph.)

ONCE upon a time, in Good King George's Golden Days, so the story-books tell, an Air Ministry official was strolling about on Croydon aerodrome when he caught sight of *Ava*, or perhaps it was *Avalon;* it may even have been both. The official, maybe, was just off for a holiday to Paris, or Cairo, or Brisbane; at any rate, he was feeling rather bright that morning, and suddenly a brain-wave surged through his grey matter. It did not even give him a headache. "By St. Chadwick!" he exclaimed, no doubt apostrophising some early Saxon worthy, "paint red, white and blue rings on one of them, and there we have the ideal machine for coastal reconnaissance!"

Whether the story-books are meticulously accurate or not is of small importance. The fact remains that from the Avro design 652 for a commercial aeroplane there sprang the latest idea for defeating submarines and other naval raiders in the waters round the British coasts. It was a novel, almost a revolutionary, method of finding a type of machine for standard R.A.F. equipment. Civil flying started in 1919 by turning R.A.F. bombers into passenger aircraft. To reverse the process sixteen years later was a breach with precedent which did infinite credit to the unknown recipient of the brain-wave.

Thus the Anson

Nor was the tactical innovation any less revolutionary. Previously, reconnaissance along our coasts had been entrusted to flying boats. Naturally, when one is over the sea it is comforting to reflect that one is sitting in the hull of a sound, seaworthy boat. Then, if there is engine trouble, one can at least get down safely into the water and await further developments. But, after all, why should one ever be forced down by engine trouble? Modern engines are very reliable, and if an aeroplane has two of them, and if it can honestly to goodness maintain height with one out of action, then a boat hull becomes unnecessary.

So, all things considered, the Avro 652 became the R.A.F. Anson.

The type has more than once been described in *Flight*. Briefly, it may be stated that the Anson is a low-wing (or almost low-wing) cantilever monoplane driven by two 340-350 h.p. Siddeley Cheetah IX engines mounted in the leading edge. The undercarriage retracts, leaving about half of the wheels protruding, in case of a hurried landing—or forgetfulness, though R.A.F. pilots never forget. The crew of three sit in an enclosed cabin with windows inherited from the *Ava* class, which give an excellent field for observation all round. To the rear of the cabin is a gunner's rotatable cockpit covered with transparent material. The pilot has one fixed gun firing forward. Wireless is an all-important item of the equipment.

For patrol work over the sea a high ceiling is not necessary. A reconnaissance machine cannot do its job if it gets above the clouds, and the paramount business of a G.R. squadron is to see and to report. At its operational height (6,000 feet) the Anson cruises at 150 m.p.h. (only the coast-reconnoitrers prefer to call it 130 knots) with a maximum speed of 188 m.p.h. The machine has a range of 600 miles, and a straight flight out of 300 miles covers quite a good bit of the breadth of the North Sea. It is not denied that for certain classes of work in that sea the longer range of a good flying boat may be desirable; but for most sorts of reconnaissance over the sea the range of the Anson would be ample, while its speed makes it, for particular purposes, the more useful class.

The class of squadron to which No. 48 belongs is called "General Reconnaissance," which does not tie the class down to any one form of scouting. Normally, however, it may be taken that the G.R. squadrons will be used for reconnaissance over the seas round our coasts. What does need some emphasis is that their work is to find, to see, and to report. *Veni, vidi, vici* is not to be their motto. They carry guns to defend themselves or for occasional use in unwonted circumstances. They can also carry a small load of bombs, and again, if no other striking force were available, they might be sent out with instructions to use them. These bombs might be effective against a submarine on the surface. But the normal procedure would be for the Ansons to find some enemy shipping, possibly a submarine, possibly surface warships, and to report by wireless telegraphy to their shore base. In that report they would state the number of ships they had sighted, their class or classes (e.g., one third-class Swiss cruiser and three destroyers), their position, the direction in which they were steaming, and their speed. It would then lie with the authorities on shore to decide what striking force to send out. They might send bombers, with or without torpedo-planes, they might hand the matter over to the Navy, or perhaps naval and air contingents might work together.

As for the Anson which had made the report, it might be instructed to shadow enemy ships or it might be ordered home. Perhaps the enemy ships might send up fighters to attack the Anson. The men of No. 48 Squadron reckon that an Anson could put up a pretty good fight, but if the odds were too great it could always use its speed to

This Power boat had fell designs on the defences of our East Coast, but the Anson spotted her and reported her position to H.Q. at Manston. (*Flight* photograph.)

escape. There are not many fleet fighters which could catch an Anson if it got a decent start. It could cover the blind spot under the tail by flying low over the water, as flying boats often do when attacked by fighters in sham fights. The Anson would have got off its report by W/T, and its next business, unless ordered to shadow the enemy, would be to get home safely. It is never out to look for trouble.

The information which the Anson is expected to send back sounds very exacting. It does most certainly demand a lot of nautical knowledge. That knowledge is imparted by the School of Air Navigation, now situated at Manston, at which all the pilots of the G.R. squadrons have already taken a course. In fact, at the present moment the work of No. 48 Squadron consists of flying the pupils on their exercises. Two of the photographs which accompany this article illustrate one of those exercises. A report had been received (it does not matter where the original report came from) that a hostile motor boat was bent on working mischief off the east coast of England. Immediately the School sent out a number of Ansons flying singly and spreading fanwise. Each was given a certain area to search. One picture shows the Anson which found the boat. Another shows the control room of the School, where the reports from all the machines are received. Officers are rapidly plotting the position of the boat as reported. The navigation of the Ansons during such an exercise is carried out by the pupils at the School, and the pilots fly according to their directions. If a raw pupil should lose his way, the pilots are experienced men and can take charge, always bringing the machine safely home. A simpler form of exercise is first to fly to one lightship, then to another, and then home; but, of course, hunting for a more mobile craft is much greater fun.

Navigational Skill

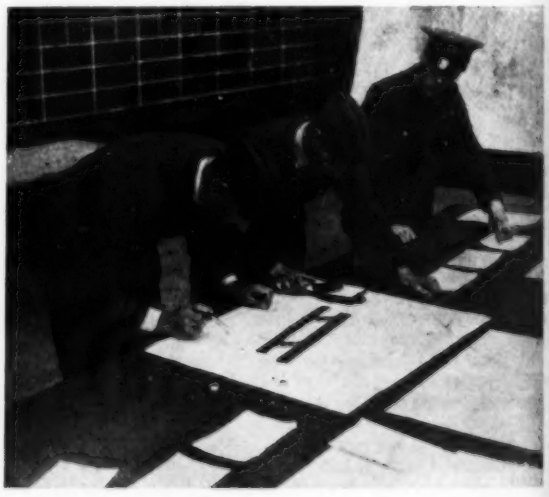
As an example of the navigational skill acquired by the pilots of No. 48 Squadron, a recent flight may be mentioned. One overcast day two Ansons climbed above the clouds which covered the whole British Isles and made their way without seeing the ground to Aldergrove Aerodrome, near Belfast. They refuelled there, and then returned with equal accuracy to Manston.

A very important feature of the instruction given at the School of Air Navigation is ship recognition. The instructors are adepts at knowing the distinguishing features of the different classes of warships in the principal navies of the world, and have a complete set of models. Naturally, it is of the utmost importance to the authorities on shore to know the classes of enemy ships spotted by the Ansons. With that knowledge before them the task of deciding on the striking force to send out is very much simplified.

No. 48 Squadron has an establishment of eighteen Ansons, organised in three flights, besides reserve machines. In addition, it has at present an extra flight equipped with Saro Clouds and Avro Prefects, which are used for the short navigation course. The organisation into flights is mainly for administrative purposes. Occasionally the Ansons fly in small formations, as shown in some of our illustrations, but when reconnoitring for enemy ships they usually work by single machines, one in each allotted sector. At present there are three G.R. squadrons in existence, but from the number of pupils at the School of Air Navigation it may be surmised that presently the number of such squadrons will be considerably increased.

There is a world of difference between the work of a coastal reconnaissance squadron and that of a fighter reconnaissance squadron in a land campaign. The pilots of the present No. 48 (G.R.) Squadron cannot fail, however, to take great pride in the work of their predecessors in the squadron during the Great War. No. 48 was the first squadron to take the Bristol Fighter to France, and so gradually to nullify the superiority which the German Albatros D.III and Halberstadt fighters had established in April, 1917, over the D.H.2, the F.E.2B., the Nieuport, and even the F.E.2D.

Let us, however, go back to the early history of the squadron. The nucleus flight was formed in April, 1916,



Officers on shore plotting the position of the boat from the W/T messages received from the Anson. (*Flight* photograph.)

and the squadron was formed at Rendcomb. It was first intended to send the squadron overseas with the B.E.12 single-seater fighter, but this idea was abandoned and the Bristol Fighter F.2A was substituted. It is scarcely necessary to remind readers that this machine was designed as a two-seater fighter. It had a fixed Vickers gun firing forward and worked by the pilot. Fitted with C.C. gear, this fired through the arc of the airscrew. The observer in the back seat had a movable Lewis gun. On March 8, 1917, the squadron flew over to France in 18 Bristol Fighters and landed at Bellevue, on the Arras front. The C.O. was Major A. V. Bettington (now a Group Captain on the Retired List), and one of the flight commanders was Capt. W. Leefe Robinson, V.C. This latter officer had gained his Victoria Cross by shooting down the Schutte-Lanz airship S.L.11 on September 2, 1916. The flaming airship (which had a wooden frame) fell at Cuffley.

The squadron arrived in France just in time for the British offensive on the Arras front.

Much was expected of this new machine, but its first performance was disappointing. The brief squadron history compiled in the field in January, 1919, admits some uncertainty as to dates, because the squadron records had been destroyed in a raid on its aerodrome, but states that the equipping of the squadron with Bristol Fighters began in December, 1916. The official history, *The War in the Air* (Vol. III, p. 336) says that No. 48 Squadron was put into the line before the pilots and observers had had time to get thoroughly used to their aeroplanes. It adds that many accidents during training in England had given the Bristol a bad reputation, and that pilots had got the idea that the machine was not strong enough to be thrown about in the air. Of course, this fallacy was soon dispelled.

On April 5, 1917, Capt. Leefe Robinson led the first offensive patrol across the lines. Pilots who were *au fait* with circumstances at the time have told the present writer that the patrol was carried too far, and that petrol was running short on the return journey. Over Douai, Von Richthofen himself, at the head of five Albatros fighters, attacked the six Bristols. Other German machines joined in. Four of the Bristols were shot down behind the German lines, and only two got home. They claimed that two Albatros machines were sent down, but they were not seen to crash. Leefe Robinson was one of the missing. His engine was shot out of action and he had to land. He spent the rest of the war as a prisoner in Germany and was only liberated when the Armistice was signed. He returned to this country a physical wreck, and died of influenza on the last day of 1918. It was alleged (perhaps incorrectly) that the Germans had treated him with especial severity because he had shot down one of their airships.

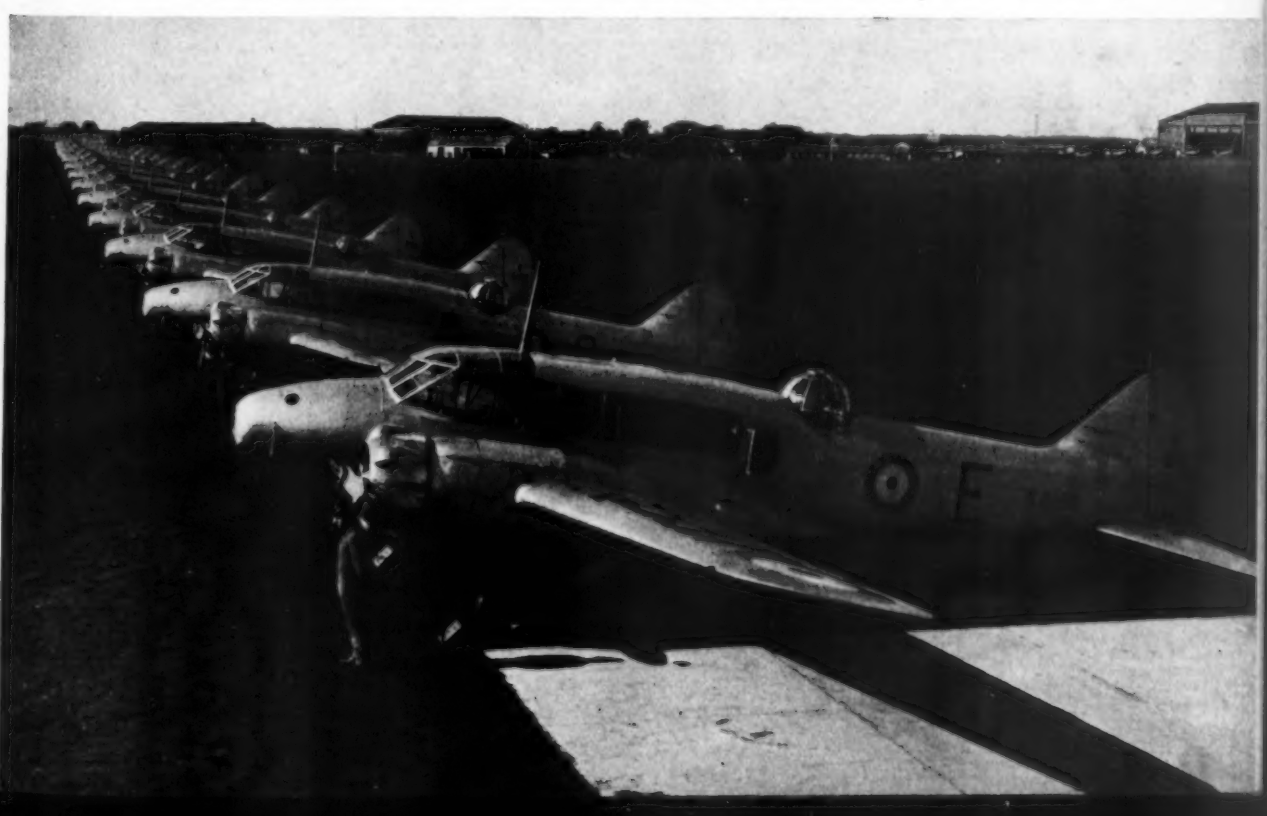
Richthofen sent in a report on this fight, in which he said that the Albatros D.III was unquestionably superior to the Bristol Fighter in speed and climb. This report greatly heartened the German fighter pilots all along the line, but before long their confidence was rudely shaken. Long before the end of the war the Bristol Fighter had proved itself one of the most dreaded killers on either side.

An Unlucky Day

Four days later, on April 9, the British infantry attacked on a day of snowstorms and a south-westerly gale. No. 48 Squadron patrolled over the lines and the Bristol Fighters had many successful combats. But on the 11th things did not go so well for the squadron. Four of their Bristols had a fight with an equal number of Albatros machines and shot down two of them. Then one Bristol pilot had to go home, probably with engine trouble, and the remaining three were all shot down by another Albatros flight which was encountered.

On the 16th of the same month the F.E.2B's of No. 11 Squadron were sent on an urgent photographic mission. In the midst of those great battles photographs were all-important to the staff officers. No. 48 and the Sopwith triplanes of No. 1 (Naval) Squadron were given the task of preventing interference with the F.E.s, and the way they did it was to sit in the air over Douai Aerodrome for twenty-five minutes. No German machine attempted to challenge them, and the much-needed photographs were duly taken.

By the 23rd the pilots of No. 48 Squadron had learnt confidence in their machines, and certain minor modifications had been carried out which made the Bristol easier to fight. There was a great dog-fight that day. Six F.E.2B.s of No. 18 Squadron started on a bombing raid, with an escort of five Pups of No. 3 (Naval) Squadron, when they were attacked by German fighters. The Pups



Some of the Avro Ansons (two Siddeley Cheetahs IX) of No. 48 (General Reconnaissance) Squadron at Manston. (*Flight* photograph.)

did their job well and held off the superior force of the enemy; but the bombers had to turn back. As soon as they were safe, the Pups turned back and engaged the enemy again. Other formations of both sides joined in, including some of the Bristols of No. 48. There were no British casualties, but at least one enemy aircraft caught fire. Finally, the Germans left the British in command of the air. "One feature of the fighting," writes the official historian, "was the superiority of the Bristol Fighter. . . . The Bristols were frequently outnumbered, but it was found they could more than hold their own against the best enemy fighters."

In course of time the battles of Arras died down, and preparations were made for a British offensive from the Ypres salient, commonly called the battle of Passchendaele. In July, 1917, No. 48 Squadron was moved up to the Flanders front and provided escorts for many bombing raids before the battle commenced. At this time the squadron several times sent up machines to attack Gothas on their return from raids over England. On July 22 Capt. B. E. Baker, after taking off from an aerodrome near Bray Dunes, met five returning Gothas and forced one down into the sea north of Ostend. The German records, however, do not admit any loss on that day.

The battle which followed was one of the most dreadful ordeals which the British infantry had to endure, and the R.F.C. certainly had the best of matters. No. 48 took its full share in the air fighting. During this period the squadron was honoured by King Albert, who twice made flights in its Bristol Fighters, once reconnoitring right over Ostend. Later in the year, in September, the squadron began to send up Bristol Fighters at night to attack Germans who were raiding Dunkirk.

As the battle of Passchendaele died away, No. 48 Squadron, then commanded by Major H. S. Shield, M.C., was moved down to the Somme area in February, 1918. The Fifth Army had extended southward there, and it was on its front that the great German offensive was to fall. Sir John Salmond had by this time obtained eight more machines for No. 48, and in preparation for the coming battle it carried out long reconnaissances and photographic flights, single machines being mostly used for both these operations, while for offensive patrols four or five machines would fly in formation.

Then the storm broke on the Fifth Army on March 21, 1918, and fighter aircraft had to desert all other work in order to make low-flying attacks on the advancing swarms of German divisions. Orders of the Fifth Brigade R.F.C. laid it down that "the Bristol Fighters are the most suitable machines for the low-flying work." There were by then a number of Bristol Fighter squadrons in France. No. 48 Squadron kept two flights ready to attack specified ground targets and one flight for long reconnaissances. This low-flying was expensive work in fighter machines and pilots. The advancing Germans simply hated the attacks; but they none the less continued to advance. Our artillery aeroplanes were left unprotected, but that perhaps mattered the less, because the gunners in their hurried retreat often failed to get their wireless sets to work.

At last the tide turned. No. 48 Squadron played a prominent part in the battle of Amiens in August, 1918, when the British and French were rolling the Germans back. At first the whole squadron was employed patrolling by single aircraft over an area twenty miles deep to Peronne and twenty-five miles long from Nesle to Bapaume. Their orders were to watch for rail and road movements in that area. Wing Commander J. C. Slessor, in his book, *Air Power and Armies*, criticises not the squadron but the use made of the squadron on that day. The area, he says, was too large, and accordingly the information received from the patrols was disappointingly meagre. Next day two of the flights were sent back to offensive patrols in the upper air, while one flight of seven machines continued to reconnoitre. The observers in these, says Wing Commander Slessor, were six flying officers and one N.C.O. He evidently considers that more attention should have been paid to reconnaissance, and by very experienced army co-operation observers.

The Phœnix

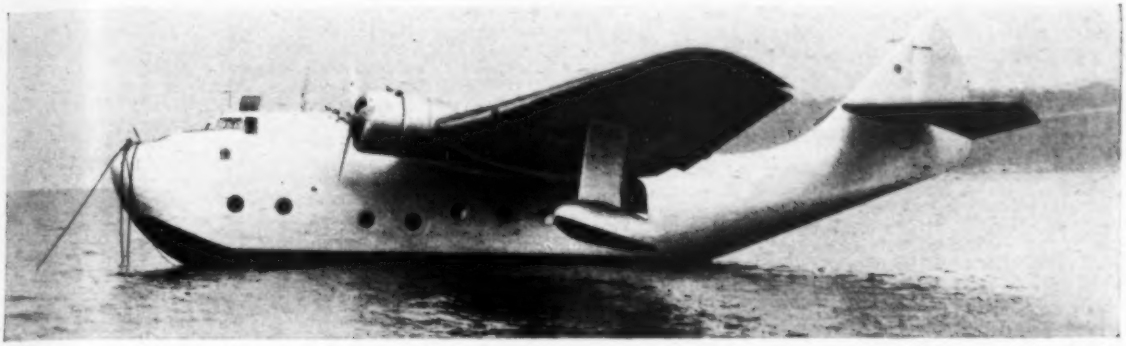
On August 24, 1918, the squadron was at Bertangles aerodrome when the Germans bombed it. Ten Bristol Fighters and all the heavy transport (and, incidentally, the records) of the squadron were destroyed. The squadron had to be withdrawn to Boisdinghem to refit, but in forty-eight hours it was back over the lines once more. This was a remarkable feat by the equipment side of the R.A.F.

At last came the Armistice, and No. 48 Squadron was disbanded, until it was reformed in 1936. It had won two Distinguished Service Orders and one bar to a D.S.O., twenty-three Military Crosses and two bars, two Distinguished Conduct Medals, two Croix de Guerre (Belgian), two Distinguished Flying Crosses and two Military Medals. It had destroyed 148 enemy aircraft, driven down 150 out of control, and also driven down another 103. It was one of the great fighting squadrons of the war.

The pilots, officers and sergeants of No. 48 (G.R.) Squadron. Sqn. Ldr. T A. Langford-Sainsbury, D.F.C., A.F.C., the C.O., can be seen in the centre, distinguishable by his broad shoulders (*Flight* photograph)

COMMERCIAL AVIATION

— AIRLINES — AIRPORTS —



THE SEA-DOUGLAS: The new Douglas DF flying-boat has, since a photograph was originally reproduced in *Flight*, been put through its paces and appears to have performed well. The machine is, of course, of all-metal construction and an interesting departure from normal Douglas practice is the use of skin corrugations in the wing covering, which, incidentally, is fabric aft of the rear spar. The recess into which the wing-float partially retracts can be seen in this view.

THE WEEK AT CROYDON

Pyrotechnics and Air Raid Precautions : One Swift-moving Body : Safety First

ON certain days of last week the scenes and sounds reminded me of bits out of one of the early B.B.C. aviation plays, largely composed of incidental noises —police rattles, tea-trays, sandpapering, and popping noises like those made by small boys, parrots and bottles of effervescent fluid.

There was the drone of aeroplanes just overhead but invisible; much activity with turnip bombs; and, at times, a perfect volley of green Very lights. Marksmanship, however, was poor on the whole, though a direct hit was nearly scored upon a defenceless D.H.86 on the tarmac.

Perfect Control

Friday was an astonishing day, for in weather which a few years ago would have definitely grounded all commercial aeroplanes, pilots of all nations were coming in one after another at short intervals—a fact which speaks volumes, not only for pilots and their aeroplanes, but also for the excellence of the Croydon traffic control. Only those who are aware of the difficulties of air traffic control can fully appreciate this effort. Capt. O. P. Jones was unfortunate with *Heracles* on that day, for somebody had left a wheelbarrow about and he saw it through the fog only at the last minute, avoided it, and made a landing which did less damage than might have been the case if the machine had been in less competent hands. The barrow was, I believe, actually within an area marked off as not serviceable, but in the fog the actual markers were practically invisible.

What with rockets, roaring aeroplanes and lit-up skies, it was like living in an air raid at times last week, and on Wednesday the authorities added a realistic touch by practising Air Raid Precaution No. 1 most of the afternoon and evening. This consists of switching all lights off and on at frequent intervals, and though cunning officials pretend it is a mere matter of failure of the electric light system no doubt it is really part of the elaborate system of precautions which is so hush-hush that nobody knows anything about it. I confess I am mildly interested to know more of this.

Everyone all over the country is talking about air raid precautions and what not, and Croydon is an obvious early target—and a vulnerable one. Are we to expect the Crimea to repeat itself (when they issued thousands of left boots and no right ones), and shall we be hurriedly issued with a blue R.A.F. gaiter apiece instead of a gas mask? After all, both words begin with "G." In that case, "All will be gas and gaiters," as the mad gentleman in *Nicholas Nickleby* remarked. "Works and Buildings" doubtless know a good gas-proof hole somewhere (they are always digging holes, anyway), and probably there is some system for preventing the numerous women, children and acting first officers from panicking. Possibly, too, there is a cunning scheme for setting all hangars alight in order to prevent the raiders from doing so. If, on the other hand, nothing has been done about it, how about setting up some swift-moving, decisive body like the Maybury Committee to brood over the matter?

Modern Methods

On Saturday morning various Air Ministry officials were at Croydon awaiting an opportunity to go up in a D.L.H. Junkers Ju.52 in order to test the Lorenz system. Weather was against such experiments, however, for there was too much air traffic about, and, with fog lying low on the ground, it was easy enough to find the Airport, but very difficult to land on it. Looking up through the haze at one time, I saw a K.L.M. Douglas looking like a big silver fish as the sun shone on it, then *Scylla*, and, again, a D.H.86, yet there was no sun at all on the ground. It is a pity, sometimes, that we cannot disembark passengers by means of lifts. Cases occurred last week of passengers who flew over Croydon either once or several times, and then had to go all the way back to Lympne to disembark.

One visitor whose charm of manner won golden opinions was the French ex-war-ace, Capt. Molinier, co-pilot to Jim Mollison. The latter, looking from the Airport Hotel win-

Commercial Aviation

dow, was worried for the safety and comfort of a Swissair pilot who was trying to get in during fog. These everyday affairs need not worry anybody. Air line pilots play for safety, and the Swissair man was merely seeing if Croydon was feasible. He had plenty of fuel, and there were other airports. With modern operations, the rule is, roughly speaking, to carry enough fuel to fly to the airport of destination and then turn round and fly back again, if weather conditions should necessitate it. That means a considerable sacrifice of possible revenue, which, in the interests of the public, the companies do not hesitate to make.

A. VIATOR.

Another Rapide for New Zealand

IN the twelve months since Cook Strait Airways started operations in New Zealand two additional D.H. Rapides have been ordered to cope with the increasing traffic. An order has just gone forward for yet another, making four in all.

The Seadrome Again

AN Australian, Mr. M. E. Heiser, has designed another version of the seadrome originally projected by Mr. Armstrong a number of years ago. The idea is being handled for the moment by British and Dominions Industrial Constructions, Ltd., of Basinghall Street, London, E.C.2.

In brief, the idea is to support landing decks on buoyant steel pillars, a number of which would be attached to "stopper buoys" lying a matter of 180 ft. below the surface. The whole seadrome would be moved and controlled, when necessary, by screws and rudders.

The deck itself would be, in plan form, U-shaped, one leg serving as an aerodrome and the other arranged in the form of a tank for flying-boat work. On the base of the "U" would be built the necessary hotel, hangars, control station, radio station, and so on, with, on the roof, catapult for relaunching flying boats when necessary. Between the legs would be an area of sheltered water for supply ships and others. Most of the necessary power would be obtained from the wind through generators and a storage battery. Each seadrome would cost about £3,000,000.

Darwin's D/F

THE Australian Air Accidents Board has concluded its investigations into the matter of the accuracy of the Darwin D/F station, and reports that this station is working properly.

It will be remembered that the Monospar S.T.18 made a forced landing on a reef some time ago, and that the crew alleged that Darwin persistently gave incorrect bearings, which, for reasons explained at the time, caused them to disregard, or readjust, the bearings given by their one and only compass. The fact that the station was working correctly at the time of the investigation does not necessarily mean that correct bearings were given to the S.T.18 operator, and more will probably be heard of the matter.

That the pilot, Mr H. Wood, and his crew did not lose their sense of humour is proved by the cable received by the Shell people in Melbourne. This read: "No Shell service reef. Why? Wood." Apparently the reef in question is only uncovered by the sea for three days at a time, so they were lucky indeed.

France and the Atlantic

PAUL CODOS, the Air France pilot and holder of the world's long-distance record, has returned to Paris from a month's thorough tour of the Azores by car, on mule-back and on foot, in search of a suitable landing ground for Air France's Paris-New York mail and passenger service.

He has decided on a suitable site in the island of Terceira, which, he says, can be converted at small cost. He reports that no suitable basin for flying boats was discovered in the islands, and the plans for experimental flights next spring by a big Farman of the *Centaur* type are therefore proceeding. The only outstanding matter is the sanction of the Portuguese Government for the use of the ground and the terms of lease; negotiations are proceeding.

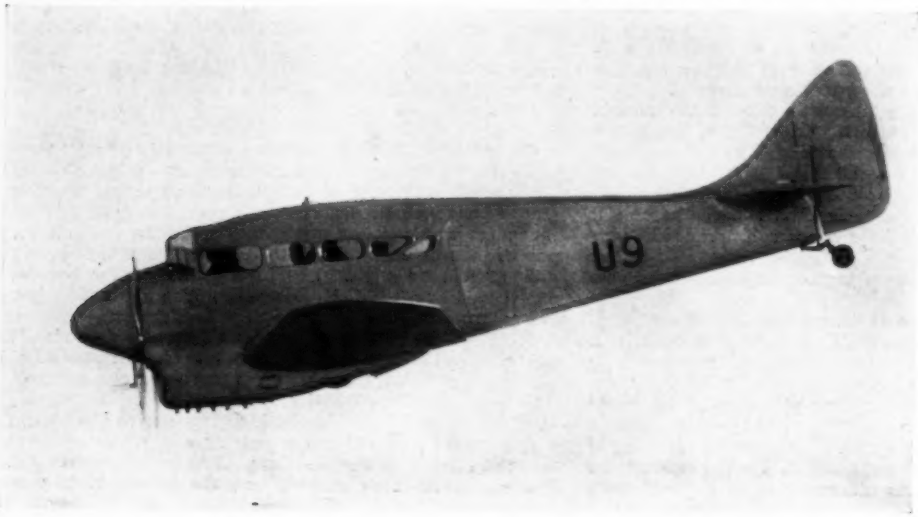
Hamburg and Hanover

THE two week-end transport accidents on the Continent, though not serious in the matter of personal damage—no one was seriously hurt in either—have a certain importance in lessons for the future and are worthy of a detailed explanation. It is sometimes difficult to be quite sure of facts in cases of this sort, but we have sifted the evidence as thoroughly as possible, and those of the Lübeck (Hamburg) accident have been obtained from a Danish source.

When flying at a height of 1,500ft. and nearing Hamburg on its way from Copenhagen, a Den Danske Luftfart Selskab Junkers Ju.52, piloted by Luft Kaptajn Charles Bramsen, suddenly shivered violently. Before the pilot could throttle back or switch off the port engine fell forward at 45 deg., the cowling disappeared, and the machine turned sharply to port.

The drag of the damaged engine must have prevented the use of the starboard engine, and the machine could not retain height on the nose engine alone. Flames, furthermore, appeared below the trailing edge and, not, perhaps, unnaturally, some of the passengers became hysterical. Lord Burghley and Mr. Dejong, Copenhagen manager of K.L.M., managed to calm them. The pilot dived the machine at the only reasonably possible space, and the Junkers ploughed through a telegraph pole, a fence and a series of trees before coming to rest—less its starboard wing. When examined it was found that a blade of the port airscrew had snapped off at the hub.

On Saturday evening a D.L.H. machine, also a Ju.52, was forced down just outside the airport at Hanover owing to the sudden formation of ice, and subsequently caught fire. With cold but clear weather, the electrical heating de-icer system was not in use, and the whole of the weight of ice appeared to have been formed in a few seconds.



INHERITED CLEANLINESS. The Miles Peregrine light transport monoplane, described on pages 594-597 of this issue, bears, from many angles, a marked resemblance to the Falcon. With two Gipsy Six II s the maximum speed with a 2,200 lb. disposable load is 180 m.p.h. Menasco Buccaneer B.6S engines, supercharged to 4,500ft. give an improvement of 14 m.p.h.

AIR MAILS ACROSS CANADA

Plans for the New Service : Extending the 1930-32 Route

FOR the first time since the previous operations were discontinued early in 1932, the air mail service will be resumed next spring in Western Canada. Mails will first be carried between Vancouver and Winnipeg, while the Canadian transcontinental service, as already announced in *Flight*, will be inaugurated—according, at least, to present arrangements made by Hon. C. D. Howe, Ottawa's Minister of Transport—on July 1, 1937.

Five radio range beacons are located on the now disused Prairie airway, but, pending results of tests with homing equipment, no beacons are being installed on the newer sections of the trans-Canada airway through the Rocky Mountains and in Eastern Canada. Sixteen airports and landing fields have been established between Vancouver and Lethbridge and will be ready for use in June, and when the entire trans-Canada airway (described in *Flight* of May 2, 1935) is completed it is expected that landing fields will be spaced 25 or 30 miles apart with a few main airports with the necessary facilities for servicing and refuelling.

The route will be lighted at night, except in the mountain section, where night flying might, for the moment, prove too dangerous. Although the new western service will bring British Columbia within its circle for the first time, Prairie air mail was originally delivered regularly for a two-year period. A trial service was, in fact, inaugurated in December, 1928, between Winnipeg, Regina, Saskatoon, Calgary and Edmonton, and this proved so popular that a regular service was begun on March 4, 1930, encompassing those five cities, together with Moose Jaw and North Battleford, in Saskatchewan, and Medicine Hat, in Alberta. The service was estimated to shorten the time for mail delivery by eighteen hours between Edmonton and Winnipeg, by twenty-one hours between Winnipeg and North Battleford, and by twenty-four hours between Winnipeg and Calgary. Machines operated between Winnipeg and Regina, and mail was transferred there to others operating to Saskatoon, North Battleford, Edmonton, Moose Jaw, Medicine Hat and Calgary. This service was discontinued as an economy measure in 1932.

The construction of emergency landing fields east of Winnipeg and in Northern Ontario, along the route of the trans-Canada airway, was, it will be remembered, undertaken as an unemployment relief scheme, and great progress has been made, although it is unlikely that the fields and other essential equipment can be completed on the Winnipeg-Montreal route before 1938. The transcontinental route runs east from Vancouver to Lethbridge, via the Crow's Nest Pass, thence to Winnipeg and across Northern Ontario to Cochrane. It then swings south to Elmsdale, Ontario, where it splits into two branches, one to Toronto, and one to Montreal.

From Montreal the line cuts across the State of Maine to Saint John and Moncton. One branch from Moncton will go to Halifax, Nova Scotia, and another will probably go to Sydney, by way of New Glasgow.

A B.C.A. Change

FOLLOWING the resignation of Sir Robert B. Chadwick, head of the shipping firm of Chadwick and Askew, from the board of British Continental Airways, it was announced on Monday that Mr. John Carr, of Belfast, would fill the vacant place. Sir Robert's resignation was made owing, it is stated, to pressure of other business and before the recent pilots' dispute concerning night flying at Gatwick airport.

The Australian Mail

THERE has been a difference of opinion in the Commonwealth Cabinet over the proposal to change the air mail rate from the figure of 6d. already accepted by the British Government to 2d. suggested by the Post Office. Some Ministers insist on the higher charge, with a progressive reduction in due course. So all is not yet settled in the Empire air mail plan.

More Air Commerce

AIR COMMERCE, LTD., of Heston, has joined forces with a large group of investment trust companies, as a result of which their capital has been increased from £4,000 to £30,000, The companies represented are the National Dominion and General Investment Corporation, Ltd., the Omnium Investment Co., Ltd., the International Financial Society, Ltd., the Equitable Debenture and Assets Corporation, Ltd., and the Securities Agency, Ltd. Mr. Robert Adeane, chairman of this group of companies, has joined the board of Air Commerce.

As the first step in the gradual reorganisation and expansion now made possible, the company has placed an order with Airwork for a D.H. Rapide. Further developments may be expected early next year.

United Air Lines Re-equipment

FOLLOWING American Airlines' purchase of D.C.3s for their sleeper and other services, it is now learnt that United Airlines have ordered twenty-eight Douglas machines and the first five D.C.3s were due to be put into operation on the San Francisco-Los Angeles division on December 1.

Shortly after the New Year this company is starting a special non-stop New York-Chicago service with fourteen-passenger "club-" type machines. Ten of the total number ordered will be of this type, ten of the normal daytime-operation type, and eight will be sleepers. All the machines will have Pratt and Whitney 1,150 h.p. Wasps. Part of the company's fleet of Boeings will be sold and a number have already been purchased by Scadta (Colombia) and Chinese interests.

For the moment, at any rate, United Airlines have no intention of bringing their fares down to the recently cut T.W.A. level, though the new fleet will, in fact, substantially lower the passenger-miles costs of operation.

The Misr Airwork Incident

AFTER being missing for more than twenty-four hours the Misr Airwork D.H.86 flying between Haifa and Port Said on the recently opened Baghdad service, was found in the Sinai Desert, near Magdhaba, by Bedouin tribesmen on Tuesday of last week. The machine was undamaged, and the forced landing was apparently made by Capt. T. St. J. Arbuthnot owing to fuel shortage after three hours' flying in heavy rainstorms.

Notices to Examinees

THE next examination for First-Class Navigator's Licences will be held at the offices of H.M. Civil Service Commissioners (6, Burlington Gardens, W.1) from January 4 to 7, 1937, inclusive, and, for practical tests, on another day which will be given in due course. The Second-Class examinations will be held during the same period. Applications must be made on or before December 7 to the Air Ministry.

Examination boards for ground engineers will be held in London on each Tuesday in January, February and March; at Croydon on the second Friday in these months; in Manchester on the first Friday in March; in Bristol on the first Friday in January; and in Glasgow on the first Thursday in February.

Hyderabad's Airport

THE foundation stone of the central building at Hyderabad's first airport, which will be opened next February as part of the Nizam's Silver Jubilee celebrations, was laid on November 4 by the Princess of Berar, wife of the heir-apparent of the State.

Apart from this central building various hangars and houses for the technical staff are now under construction, and £12,000 has been spent on the acquisition and levelling of land. Practically all expenses at the present stage are being borne by the State Government. The administration is in the hands of the Civil Aviation Board, on which interested Government departments are represented. Founded in 1932, its first action was to arrange the diversion of the regular bi-weekly Karachi-Madras service via Hyderabad. For this detour the State Government pays an annual subsidy of £1,500 to Tata Sons, who operate the line under contract with the Government of India. The Board is closely associated, both personally and financially, with the Aeronautical Training Centre at New Delhi, where three vacancies are reserved for candidates from Hyderabad each year.

As already recorded in *Flight*, it is proposed to run commercial air services under the administration of the Railways Department which will be responsible for the purchase and maintenance of the machines.

THE MILNER V.P. AIRSCREW

A New and Very Promising Solution of a Difficult Problem : Operation Solely by Throttle

ALTHOUGH many of the suggested types of variable-pitch airscrew work well as models it is not uncommon to find that when built to full scale the pitch-changing mechanism fails to function, being unable to overcome the greatly increased loads which oppose it. The Milner variable-pitch airscrew is claimed to be fundamentally free from this defect, since it depends for its operation upon naturally inherent forces which increase in proportion to the growing opposing frictional loads. The variable-pitch mechanism consists of two separate and distinct parts, the pitch-changing mechanism and the pitch-control mechanism, which not only operate independently but are dependent for their operation upon different essential principles.

The pitch-changing mechanism depends for its operation upon centrifugal force; this acts upon the blades of a rotating airscrew in such a way as to produce a couple which tends to twist the blades about their axes and reduce the pitch. In the Milner airscrew the blades are linked by crank pins to a sleeve surrounding the airscrew shaft, so that any twisting movement of the blades in their sockets must be accompanied by a sliding movement of the sleeve. Inside the sleeve is a compression spring, so arranged that it opposes the tendency of the blades to turn to fine pitch, and of such strength that when a predetermined speed of rotation is reached, the spring is compressed and the blades twist towards fine pitch, moving the sleeve forward. When the rotational speeds falls below its predetermined value the spring takes charge and forces the sleeve back, returning the blades to maximum pitch. The actual value of this predetermined speed will depend upon the requirements of the machine for which the airscrew is intended, but will usually be approximately that corresponding to the minimum power required for level flight and consequently well below any speed likely to be used in normal flying. It will be seen that the pitch may be changed from coarse to fine and vice versa by merely opening and closing the throttle and so varying the rotational speed of the airscrew over a range which includes at its lower end the predetermined value. Experiments with a stationary engine of 500 b.h.p. have proved that change of pitch effected in this manner is rapid and reliable.

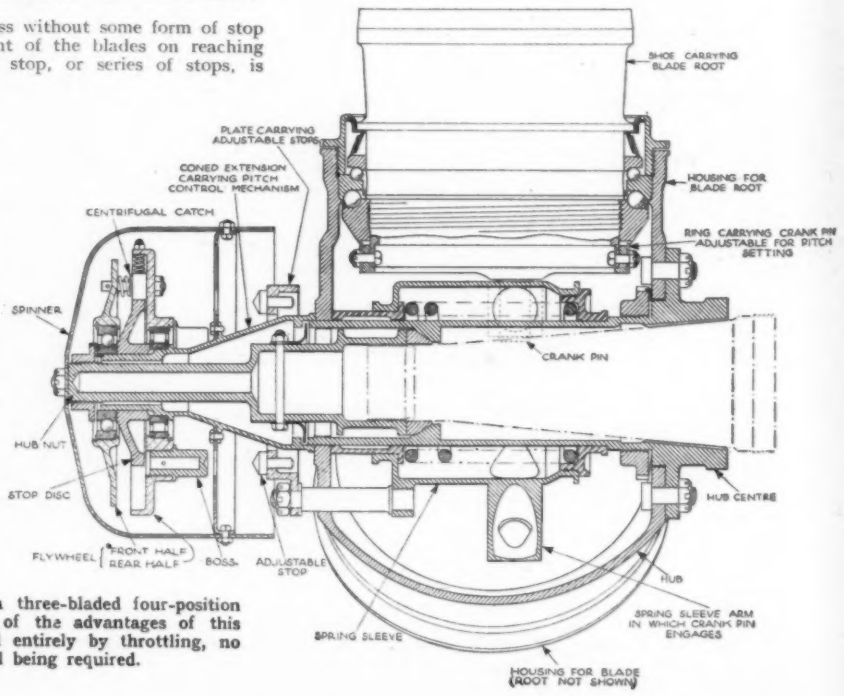
Such a device would be useless without some form of stop to arrest the twisting movement of the blades on reaching the desired pitch, and such a stop, or series of stops, is provided by the pitch-control mechanism. The essential principle upon which this depends is the fact that a flywheel loosely mounted on a spindle will, owing to its inertia, tend to maintain its original speed of rotation when the spindle is subjected to acceleration or deceleration. The pitch-control member consists of a flywheel mounted on anti-friction bearings on an extension of the airscrew shaft. The flywheel is split laterally, the front half being mounted on ball bearings, and the rear half on roller bearings which allow it to slide in a direction parallel with the airscrew shaft, as well as to rotate about it. The travel of the rear half is limited in the backward direction by pins connecting it to the front half; it is opposed in a forward direction by compression springs mounted on these pins, and absolutely limited by a stop disc keyed to the airscrew shaft and located between the two halves of the flywheel. The object of this arrangement is to ensure that no lateral loads are taken by the anti-friction bearings.

The extreme angle through which the flywheel assembly can rotate relative to the airscrew shaft is limited by stops on the flywheel and on the stop disc. As the rotational speed of the shaft increases, the inertia of the flywheel causes it to lag until one set of stops is in contact, and when the speed of the shaft is reduced, the momentum of the flywheel carries it round until the other set of stops is in contact. The extreme positions of the flywheel correspond to maximum and minimum pitch, and intermediate pitches are given by controlling the movement of the flywheel between the stops, such control being effected by a series of latches carried on the flywheel and arranged to engage in turn a catch on the rim of the stop disc. The latches are held in contact with the rim of the disc by springs so adjusted that they are compressed by the centrifugal forces on the latches at successive predetermined rotational speeds, and as each latch lifts, the flywheel moves round until the next latch engages with the catch on the stop disc.

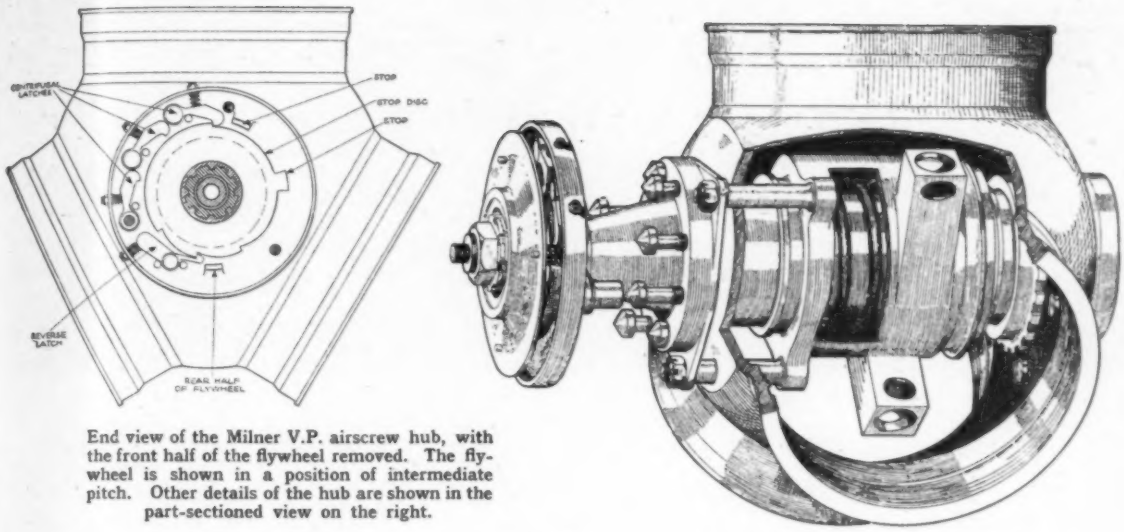
Pitch Selection

A number of adjustable stops are arranged in diametrically opposite pairs round an annular plate carried on an extension of the sleeve, and on the side of the rear half of the flywheel, facing these stops, are two bosses. The latches are so spaced that, when the rotation of the flywheel on the airscrew shaft is arrested, the bosses are opposite a pair of stops, and as the pitch decreases and the sleeve moves forward, the stops meet the bosses and, entering recesses in them, lock the flywheel against further movement; while the bosses, resisting further movement of the sleeve, lock the pitch of the blades. No further change of pitch is possible until the engine is throttled down to the predetermined speed at which the spring takes charge and withdraws the stops clear of the bosses.

The longest pair of stops locks the blades in the position of maximum flying pitch, and is withdrawn a short distance



Section through the hub of a three-bladed four-position Milner V.P. airscrew. One of the advantages of this airscrew is that it is operated entirely by throttling, no extra cockpit control being required.



End view of the Milner V.P. airscrew hub, with the front half of the flywheel removed. The flywheel is shown in a position of intermediate pitch. Other details of the hub are shown in the part-sectioned view on the right.

clear of the bosses when the spring is fully extended. Each pair of stops is of a length different from that of every other pair, and the particular pitch required is obtained by throttling down to the predetermined speed and then opening the throttle until the rotational speed is reached at which all the latches before that corresponding to the desired pitch are released, thereby allowing the flywheel to move round and present the bosses to the appropriate pair of stops. When this has been done, the progressive reduction in pitch will cause the speed of rotation to increase. In order to prevent the latch lifting, and further movement of the flywheel before the pitch is locked, a slight degree of throttling may be necessary. If such throttling causes a moderate amount of deceleration, the flywheel cannot return towards the coarse-pitch position, as it is held by the reverse latch. The spring on this latch is so adjusted that the latch is held clear of the rim of the stop disc until the first of the other latches is about to open, when centrifugal force causes the reverse latch to overcome its spring and engage with one of the series of catches on the stop disc, preventing any reverse movement of the flywheel. Experiments with both forms of latch have proved that there is no difficulty in adjusting the springs so that the latches operate with certainty at any desired rotational speed.

The diagrams show the proportions of a hub and three-bladed airscrew suitable for a 1,000 b.h.p. engine, the airscrew diameter being 12ft., and the maximum diameter of the blade root being 180 mm. The hub, as drawn, provides four pitches, each of which can be selected and obtained by the use of the throttle only. It will be seen that this airscrew is interchangeable with an ordinary fixed-pitch airscrew, since no alteration of any kind is required to the engine, and no additional cockpit controls are needed.

The Milner airscrew has been developed to its present form by, and is owned by, V.P. Airscrews, Ltd., 1, Crescent Place, Cheltenham, from whom further particulars may be obtained by responsible firms. The fact that this new airscrew has been designed by Mr. H. L. Milner should ensure for it a careful hearing, as Mr. Milner has been connected with the development of variable-pitch airscrews for a good many years and knows, none better, the "snags" that are likely to come to light after prolonged running. Associated with Mr. Milner are Mr. G. H. Dowty and Lt.-Col. J. D. Blyth.

PITY THE POOR PILOT!

CHARLES SCOTT speaks nearly as well as he flies, and the sentiments he voices so pungently are guaranteed to allay the soporific numbness so often attendant on trite orations in his honour.

Not that last Thursday's house dinner at the Royal Aero Club for him and Giles Guthrie was one of the occasions when his flow of wit was needed to purge the mind of platitudinous accretions; the chairmanship of Sir Francis McLean was assurance of that.

Sir Francis recalled his own trip from Alexandria to Khartoum with Alec Ogilvie in 1913 (it took three months), and went on to compliment Scott and Guthrie on their 2 day 4 hr. 57 min. trip to the Cape. He made one point which was later to be emphasised by Scott himself, namely, that the human factor in long-distance flying is being relegated to the background, where it is obscured from the limelight by what Sir Francis termed "someone's elevators and rudder bars."

Scott revealed that he had been commanded by Sir Francis to refrain from talking technicalities. He described his idea of fun (relative, of course) as flying over some terrifying terrain or awe-inspiring ocean and consoling himself with the thought "Poor old 'Lamps' pays." The exercise of the elbow, he believed, was beneficial to long-distance record breaking quoting one amusing example of what conscientious application can achieve. But on one point he was particularly and righteously emphatic; he was *blowed* if he could see why certain newspapers should say that long-distance, record-breaking flying is sixty per cent. luck and forty per cent. aircraft.

Scott revealed, quite frankly, that he and Guthrie had no desire to fly back from South Africa, but they encountered so much criticism arising out of the tragi-farcical race that they set themselves to do it. Guthrie had actually booked his passage by Imperials.

Giles Guthrie immediately charmed his audience with "As I was coming down from school"; no bombast here. Then he regaled the company with anecdotes relative to the flight.

F/O. A. E. Clouston, one of the competitors who fell by the wayside, told his chapter of accidents, and complimented the winning team and the Club. He must have the patience of Job, for his luck was appalling.

Clouston recalled that Mr. Schlesinger had stated that next year he hoped to sponsor a race for double the prize money, and to take Scott's advice to make it international.

The German Air Attaché, Major General R. F. A. Wenninger, hoped that, through the medium of the race, his country would be able to vie with us in friendly and peaceful competition.

A New Press-Tool Factory

WHEN the Rt. Hon. the Earl of Dudley, M.C., T.D., D.L., J.P., formally opened a most impressive new factory for Fisher and Ludlow, Ltd., in Bordesley, Birmingham, last Friday, he foreshadowed that the work to be accomplished there was of national importance, particularly in regard to the use of pressed-steel work for aircraft.

The new factory, said to be one of the best of its kind in Europe, is for the manufacture of press tools, dies and jigs, and it has a floor space of approximately 100,000 square feet. The main structure caters for fourteen overhead cranes, from five to twenty tons carrying capacity, which serve the whole of the ground floor, so that the heavy dies and so forth machined by the large planing, milling, slotting, die-sinking, shaping, drilling and grinding machines, may be easily moved.

Private Flying

Topics of the Day

Decision

WHEREAS the amateur pilot who hires his machine from a club or school has little or no responsibility in the matter of safe flying conditions, the private owner or the pilot who obtains his machine from a hire company has usually to make up his own mind. And very difficult it can be—particularly if his proposed journey is likely to be a complicated one covering a good deal of the country. Conditions in the north-west, for instance, are usually very different from those in the south-east.

If he is merely travelling from A to B he can ring up the Met. Office and obtain a route report, but if he is hoping to go on to C, D, and E before returning to A, the business becomes involved, expensive, and time-wasting. On the other hand, nobody looks forward to the prospect of a weather-bound night at C—minus toothbrush and pyjamas. Moral: Leave such things permanently in a machine which is regularly used for winter flying—not forgetting to air the pyjamas before use.

Since I continually meet people who appear not to have heard of the weather broadcast facilities, I have no compunction in saying, for the umpteenth time, that, on a wavelength of 1,181 metres, the Air Ministry provides general forecasts and detailed reports almost half-hourly from the old Daventry station.

Real Service

METEOROLOGICAL forecasts can never be perfectly accurate, but they at least give a general idea of the likely conditions, and will be specific enough in the matter of line squalls and the like. The actual aerodrome reports cannot, of course, be questioned, and these are broadcast in the morning only fifteen minutes after the moment at which the conditions of cloud height, visibility, and wind speed have been examined at the various points.

In the summer the general forecast for the day is put on the air at 7.45 a.m., and this is a very useful time, since it allows the pilot to make up his mind whether to go out to the aerodrome or to go to the station forthwith. In winter, with the change to normal time, this forecast is put forward to 8.45 a.m., and its comparative lateness is the only criticism I have to offer.

Probably it cannot be helped, since the forecast must be based on observations and reports from a number of stations, both here and abroad, and G.M.T. is the standard time. In any case, reports from key stations are broadcast as early as 7.15 a.m. from observations at 7 a.m., though conditions at the crack of dawn are not likely to be typical of those applying later.

In the interval between our moans about this and that concerned with bureaucratic procedure, let us give due measure of praise to the Meteorological Department for this very real and complete service to amateur and professional aeronauts.

Comparative Values

HOWEVER low the price of the ultra-light machine may eventually be with the reduction of A.I.D. and overhead costs, the more powerful, roomy, and practical light aeroplane will continue to provide equally good value for money. If you pay £200 you obtain two hundred pounds' worth of aeroplane; if you pay £1,000 you get a thousand pounds' worth of aeroplane, whether some of that money goes in C. of A. and inspection costs or not.

The same applies in the case of running costs. The more powerful machine may cost twice as much in fuel, oil, and maintenance, but it is reasonable to suppose, when head-wind, range, and daylight effects have been properly considered, that its owner will often fly almost twice as far. A wind of 30 m.p.h. at cruising altitude is quite a common thing. In four hours' flying against this wind the ultra-light with a cruising speed of 70 m.p.h. will have travelled 160 miles, whereas a machine capable of cruising at twice the speed will have travelled 440 miles.

On a basis of time alone the difference would cancel out, since the slower machine gains proportionately more when flying down-wind. Nevertheless, it is to be presumed that every pilot is going somewhere, and any air-race handicapper can tell you that the faster the machine the less is its average out-and-home speed affected by strong winds.

If you work it out on a triangular course you will find that the differences are very considerable. Sales-talk about fuel and oil costs, therefore, must not be taken too seriously, except in the case of a machine used purely for "fun by the hour." Maintenance, replacement, and storage costs, however, are likely to be a good deal lower.

Room for All

ALL in all, therefore, the new ultra-light type cannot be looked upon as a direct competitor of the full-size machine. Each has its sphere of usefulness, and those who purchase the little fellows are likely to be those who would not, in any case, be able to afford anything larger. Conversely, it is unlikely that the pilot who can afford to buy and to run the more useful and comfortable machine would willingly go all ultra-light-minded unless he wanted it purely for flying enjoyment, such as can be obtained in machines of Dronish character.

Incidentally, it is interesting to compare present-day prices with those of the early and somewhat crude open-air contraptions of 1925 and 1926. The majority of people complain that prices have gone up too far; perhaps they have, but so has the standard of comfort, the range, and the luggage capacity. Last week at Hatfield I learnt that the price of the Hornet Moth had been, or was about to be, reduced to £775. The 1927 Cirrus II Moth cost £730, with two open tandem cockpits, an inconvenient and tiny luggage locker, and a doubtful range of 325 miles in still air.

INDICATOR.

FROM the CLUBS

Events and Activity at the Clubs and Schools

LONDON

THICK fog experienced during the week brought down the flying times to 30 hr. 15 min. New members are Messrs. W. E. Hayes, N. Gliksten and B. B. Williams; Mrs. P. W. Rowley has completed the tests for her "A" licence.

BENGAL

Flying times for October totalled 29 hr. 35 min. dual and 36 hr. 10 min. solo. Four members, Mrs. I. J. Lewis, Messrs. Biren Roy, H. I. Matthews and T. B. Elley made lengthy cross-country flights.

BROOKLANDS

The aerodrome was enveloped in thick fog during the major part of last week and instructors and pupils were "grounded." New members are Miss Undine Bax and Mr. Reid-Davis. Mr. Ken Waller is quite fit again and is now "on duty" at the aerodrome.

CINQUE PORTS

Last week's fog brought its usual complement of air liners and their passengers. Several large machines were housed at Lympne owing to even worse weather conditions at Croydon, one unfortunate machine leaving its aerial on a tree while making a landing. Mr. Chalmers has obtained his "B" licence, and Mr. Hilditch has commenced his instructor's course.

YEADON

For the fortnight ended November 20 flying times totalled 15 hr. 20 min. The Club's annual ball, held at the Grand Hotel, Harrogate, on November 20, was very successful and attended by about 150 members and friends. The second annual ordinary general meeting of the Yorkshire Aeroplane Club, Ltd., and its associated company, Yorkshire Airways, Ltd., will be held on December 3.

DERBYSHIRE GLIDING

Despite a precedent of three years' standing, the national competitions of the British Gliding Association were held in Derbyshire this year from August 29 to September 6. The weather was not very kind to cross-country aspirants, Mr. P. A. Wills being the only one to make a distance flight of any consequence, but eighteen machines put in a total of 176 hours' flying during the week.

The progress of training at the Derbyshire and Lancashire Gliding Club has been very satisfactory considering that this is only the second year of operation. Up to the beginning of November Club members had gained nineteen "A," eleven "B," fourteen "C" and two "Silver C" certificates. The Club is unique in being able to fly in any wind direction and already distance flights of over fifty miles have been made in northerly, easterly and westerly directions from Club sites.

REDHILL

Fog seriously curtailed flying hours for the week ended November 27, only 19 hr. 20 min. being logged on Club machines.

YAPTON

Flying times for November to the 28th totalled 57 hr. 30 min., the aerodrome being fogbound for many days. Mr. Donald Prentice has passed the "Engines and Rigging" technical examination for his "B" licence.

SOUTHEND

Flying was considerably curtailed during the week owing to fog, but the Southend Flying Club had several visitors during the week-end. Mr. D. H. Clarke has qualified for his "A" licence. A social evening is being held on Saturday, December 12, at 8 p.m.

HANWORTH

Weather at Hanworth last week was anything but good and kept times down to 10 hr. 25 min., most of the flying consisting of joy-flights and charter work. Mr. M. Aslum, from India, has his Indian "A," but is anxious to qualify for the English version.

CAMBRIDGE

Marshalls' Flying School put in 33 hours' flying last week. Fog has seriously handicapped flying activities and for three days no machine was able to leave the ground. Messrs. Goodbody, Roles and Butterworth have joined the School, Mr. Anderson has passed his "A" licence tests, while Mr. Calthrop has gone solo.

READING

Owing to the prevalence of fog practically no flying was done during last week. However, a large crowd assembled at the clubhouse for the first dance of the season, which proved a great success. Among those present were Mr. and Mrs. Miles, Mr. Powis, Mr. Peter Godfrey, Mr. Victor Burnett and Mr. and Mrs. Parrott.

PORTSMOUTH

Bad weather brought down the flying time last week to 13 hr. 5 min. Two enjoyable evenings were held during the week in the form of a dart match (!) against the Southsea Rowing Club and a bridge drive, prizes for the latter being presented by Dr. F. G. Mundell on behalf of the directors of the Club. Mr. D. G. Riches has joined as a member.

SOCIABILITY AND SAFETY: This unusual flying picture of the D.H. Hornet Moth reflects credit on the pilots both of the D.H. 87B (the official designation of the Hornet) and of the machine which carried *Flight's* photographer. Incidentally, its price has just been reduced to £775—a figure which is distinctly reasonable for a side-by-side cabin machine of this type. With a normal range of 600 miles and possessing excellent "small field" capabilities on full load, the Hornet, though not exceptionally fast (it cruises at 105 m.p.h. or a little less), is a really useful private owner's aeroplane. Its good take-off gives it possibilities as a floatplane and at least one machine has been successfully flying in this guise over in Canada.

Private Flying

NORFOLK AND NORWICH

Members are reminded that the first of the supper dances will take place at 8.30 p.m. to-morrow (Friday) in the clubhouse. Last Tuesday evening Mr. J. Cork gave his first lecture on first-aid, which was attended by the staff and a number of members. It is hoped that there will be a large increase of pupils at future lectures. Mr. R. D. Hesketh has gone solo.

SCOTTISH

The Club's Drone, and other aircraft in the workshop at Renfrew, suffered a certain amount of damage during the gale on the night of October 26-27, when the door was blown in. October 12 was a notable date in the Club's history for it marked the first visit by a foreign commercial aircraft—a D.L.H. Junkers carrying a German football team. Messrs. G. O. Vaughan and W. M. Paterson have secured their "A" licences during the past month.

BORDER

Fog has seriously curtailed flying activities at Carlisle during the month. The annual cabaret ball was a great success from every point of view. Tickets were limited to 250, and they were all taken up. The somewhat unique scheme of decoration, consisting of illuminated aeroplanes and seaplanes of all sizes and shapes, was much appreciated and a small aeroplane flew about the hall dropping "bombs" to lucky winners of free flights. The aerodrome drainage scheme, started earlier in the year, is being slightly extended to take in one or two places which have become soft owing to the recent heavy rains.

YORKSHIRE AVIATION

Fog has been responsible for holding up flying during the last week at both York and Leeming, but at the latter Mr. Lawson qualified for his "A" licence. Provisional arrangements are now being made by the Anglo-German Flying Club in conjunction with Yorkshire Aviation Services to hold an International meeting at York Aerodrome during the first week-end in June. Already very many distinguished pilots have promised to attend. It is further hoped and expected that York Corporation will grace the meeting with their support, especially if the Lord Mayor of Frankfurt pays an official visit to the city by air. A committee is in process of formation under the chairmanship of Mr. Alex Montieth and Herr Schumacher.

C.A.S.C.

On November 25, No. 4 (Kent) Squadron of the C.A.S.C. was officially inaugurated at Dartford. Mr. R. T. Dew, the hon. secretary, addressed the meeting explaining how the man of limited means could learn to fly at a very low figure by joining up with the C.A.S.C. and therefore taking advantage of the low rates of instruction. Councillor A. Webb, Mayor of Dartford, chairman of the meeting, said that in his endeavour to put Dartford on the map he had in the past attempted to get an aerodrome, but had been unsuccessful. Now, at any rate, the town would have somebody whose enthusiasm might make this possible. Fourteen members attended the Club during the week and flew 6 hr. 50 min., four taking their initial flights.

BOMBAY

An annual feature of the Bombay Flying Club (the largest flying club in India, with a membership of 500) is, of course, an instructional flight from India to England and return. As duly recorded, this flight has now returned. During October twenty-three new members were enrolled, and many applications for membership have been received. Flt. Lt. J. A. Simpson has joined the Club as chief instructor, while Mrs. C. A. Kapadia has gone solo. On Sunday, October 25, a forced landing competition was held in which fourteen members competed, the winner being Mr. K. R. Gazdar, and Mr. R. E. Popper runner up. The flying time for the month amounted to 154 hours, Mr. D. F. Amin renewing his "A" licence and Mr. C. B. Rodgers qualifying for this licence.

TORONTO

Lord Wakefield of Hythe has donated to the Toronto Flying Club a Percival Vega Gull, to be used in the training of pilots taking the commercial flying course. The Club will thus be in a position of being able to offer the most advanced training in Canada, the aircraft available now consisting of Gipsy Moths and Puss Moths in addition to the Vega. On November 7 an impressive ceremony was held on the occasion of the official opening of the Annual Motor Show in Toronto, when the Lieutenant Governor of Ontario, the Hon. Dr. Herbert Bruce, accepted the Vega Gull on behalf of the Club from Mr. H. H. Ferguson, Canadian representative of Lord Wakefield. It was duly christened *Wakefield of Hythe* by Mrs. Bruce. The machine is attracting great attention at this show, as it is claimed to be the fastest single-engine aircraft in Canada.

MADRAS

Two landing competitions were held during October, the first an open event and the second for those with less than fifty hours' solo experience. There were twelve and six entrants respectively, Mr. Duraiswamy (who only flies once a week) winning both competitions and two silver spoons in commemoration. The Rajah of Vizianagram and Mr. Thirumulai have gone solo, and Madame Trion (sister-in-law to M. Mignet) has joined as a flying member, taking dual in the Club Swallow. In the way of cross-countries Mr. Arya flew to Colombo and back in a Gipsy. Incidentally, this gentleman has recently been awarded a scholarship by the Government. Mr. Mathai flew Dr. Appel in a Gipsy to a patient in Trichy and returned alone. Mr. Sundaram flew to Bangalore and back in the Puss and Mr. Sundararajan and Master Parthasarathy flew in the Puss to Bombay and back.

ANTARCTIC PERSISTENCE

Mr. Lincoln Ellsworth's Lecture to the Royal Geographical Society on His Antarctic Flight

IT was left to various commentators speaking after Mr. Lincoln Ellsworth's lecture before the Royal Geographical Society last Monday to point the true morals and to explain the full lessons of his 1935 Antarctic flight.

On this, it may be remembered, he and Mr. Hollick-Kenyon, the Canadian pilot of his Northrop Gamma, did not fly out and home from a base, but chose to fly from the Weddell to the Ross Sea, where they were to be picked up by the supply ship in due course. By this means it was possible to cover a really useful distance and to plot the position of mountain ranges and so forth which were otherwise "out of bounds."

Secondly, between the starting point and the final landing, owing to fuel failure, some sixteen miles from the Bay of Whales in the Ross Sea, quite a number of landings were successfully carried out. The first was made some 600 miles from their final destination in order to fix their position by sextant readings. They stayed for seventeen hours at this camp. Pushing on, they flew for only twenty minutes before waiting for the weather to improve. Three days later they tried again, but were held up by a blizzard for another three days after a flight of less than an hour's duration. The moral concerns the fact that whereas discoveries can be made from the air, exploration, as such, can only be carried out on the ground, and if landings can be safely made on the Antarctic plateau then the area can be properly prospected and not just looked at. The aeroplane becomes an auxiliary and vitally necessary means of fast transport.

Unfortunately, weather is the biggest difficulty. During the short period in which any real efforts are possible the meteorological conditions vary almost hourly, it appears. When the weather is good it is possible to see for distances of a hundred miles or more, but the winds are terrific and a fast machine is necessary to deal with them.

Mr. Ellsworth, in his modestly delivered lecture, explained how he tried in 1933 and failed before a flight had even been made, owing to the fact that pack ice damaged his Northrop. In September, 1934, he was back again, but after a short flight he had trouble. Success was attained in November and December, 1935.

They took with them all the necessary materials for a prolonged absence from a base, particularly as it would be necessary for them to stay in the deserted camp at Little America until the supply ship, the *Wyatt Earp*, could reach them from the point of departure. The actual flying time for the journey was 20 hr. 15 min.—a pretty good piece of endurance flying for an otherwise loaded machine designed as long ago as 1931. Unfortunately, the two-way radio broke down during the flight, and the lack of news caused the *Discovery II* to make a special trip to Whale Island. The crew of this research ship actually picked them up after they had reached Little America on foot, covering about a hundred miles in the prevailing fog.

Complete Dual

AN engagement has been announced between Flt. Lt. J. A. Harris, R.A.F.O., and Miss Helen Marcelle Harrison, of Somerset West, Cape Province.

Flt. Lt. Harris, of course, is the chief instructor of the London Aeroplane Club, and Miss Harrison is, we believe, only the second member of her sex in his country to have obtained an instructor's licence.

TAPERED WINGS

Resumed Discussion of Dr. Lachmann's Recent Paper : Vexed Question of Sweep and Taper Ratios : Mr. Nazir's New Control

THE recent lecture by Dr. Gustav Lachmann on Tapered Wings (see *Flight* of October 15, 1936) left little time for discussion of the many problems connected with the aerodynamic and structural aspects of tapered wing design, and the Royal Aeronautical Society did well in arranging to continue the discussion last Thursday. The meeting was held in the library of the Society and was well attended, although not as well as the occasion merited. Mr. H. B. Irving, of the N.P.L., took the chair in the unavoidable absence of Major Buchanan, Deputy Director of Technical Development at the Air Ministry. Mr. Irving suggested, and it was agreed, that the discussion might be divided into two sections, the first dealing with aerodynamic and the second with structural design of tapered wings. Dr. Lachmann replied to individual speakers as soon as they had finished.

Mr. Irving, in opening the discussion, called attention to a possible connection between taper and dihedral. At the N.P.L. they had, of course, carried out tests on a variety of wing models, and he pointed out that in a parallel wing a sweep-forward had the effect of reducing dihedral while a sweep-back had the effect of increasing dihedral. (When one comes to think of it, this is obvious, but it probably had not occurred to anyone.) He thought something of the sort must also happen with a tapered wing, and that the dihedral effect would be influenced by whether the sweep was forward or backward. Another point to which he would like to draw attention was the effect of flaps. He was informed that on one low-wing aeroplane pilots were warned not to sideslip the machine when the flaps were down.

Dr. Lachmann replied that he had experience of one machine in which the dihedral was altered, and this seemed to have but a negligible effect on lateral stability.

Scale Effect

Mr. Stanley Evans expressed the view that low-scale model tests might be very misleading and recalled by way of substantiating this view the early low-scale tests on thick wing sections; these gave the impression that thick sections were inefficient, and it was not until comparatively recently that full scale had disproved that impression.

At present little was known of the behaviour of the airflow and pressure distribution over a tapered wing, and he pleaded for systematic research, with Government support, on elliptical plan forms of different aspect ratios. Some curves of lift distribution in Dr. Lachmann's paper were, he thought, taken from a very early German report. (To this Dr. Lachmann replied that the lift distributions in his paper were calculated from fundamental theory.) Mr. Evans concluded by asking how one could define the taper ratio of a wing of elliptic plan form.

Dr. Lachmann pointed out that American reports on tests at high scale *had* been published (about one or perhaps two years ago). There had also been a recent one (in the Journal of the Aeronautical Sciences) on partial flaps. He agreed with Mr. Evans that systematic research was needed, but thought this need only relate to the friction part of wing drag. Lift and induced drag could be calculated from theory, and he did not quite see the need for research on elliptical plan forms. The difference in induced drag between an elliptical plan form and one of straight taper was very small.

Dr. N. A. V. Piercy, head of the aeronautical department of the Queen Mary College, referred to the question of form drag research and recalled an old report, R. and M. No. 1241, published in 1929 [This report dealt with experiments on a series of symmetrical Joukowski sections of varying relative thickness, the tests being carried out at high values of the Reynolds Number.—ED.] If they did not believe that report it was time they came out in the open and said so.

Dr. Piercy then proceeded to "debunk," in quite polite language, of course, the fetish of the elliptical plan form. This, he said, was a mathematical figment. The flow around a real physical wing could not possibly be like that assumed by the mathematician; one could not have infinitely great velocities. On the real wing it was only some 80 per cent. of the lift which was found to be uniform. Near the tip the flow was quite different from the general flow. He asked if Dr. Lachmann had found trouble with the twisted wing in the down-gust case, as his experiments had led him to believe that such trouble was to be expected. In conclusion, Dr. Piercy mentioned the research work done at Queen Mary College by Mr. Nazir, who had evolved a cut slot which postponed the stall by five degrees, gave a great increase in lift, and very powerful rolling moments.

Mr. P. P. Nazir added to Dr. Piercy's remarks the statement that another thing he had succeeded in doing was to change the violent tip stall into quite a moderate stall. He hoped soon to publish an article describing his control device and the results obtained with it.

Mr. R. P. Alston, of the R.A.E., on the subject of wing tip stalling, said this might not be such a serious matter. He had known cases where the lateral stability was quite good although the tips were stalled. The type of wing-dropping depended largely on whether the stall was a leading-edge or a trailing-edge stall. It was desirable, in discussing taper ratios, to distinguish between the characteristics in normal flight and those near the stall. With high taper ratio stability was reduced in ordinary flight. He knew of one machine in which the wing tip stall was vicious at considerable height, but not so when the machine was near the ground.

Taper Ratio

Mr. W. E. Gray suggested that a simple way of determining the taper ratio of any wing, elliptical or otherwise, would be to take the position of the centre of area. (Mr. Evans had suggested the block figure as a possible basis.) With reference to Mr. Irving's remarks about pilots being warned not to sideslip a machine with flaps down, he thought the explanation was the very simple one that in a sideslip with partial flaps, the tail might be brought out of the region of strong downwash behind the flaps and into a region where there was little downwash. This would presumably tend to make the machine drop its nose.

Mr. Gray then showed a slide of curved flow over the top surface of a yawed wing, the deflection being greatest at the leading edge and then gradually straightening out as the trailing edge was approached. His tests showed a deflection of about ten degrees, while Mr. Lock had stated that it could not exceed eight degrees. The spanwise deflection was due, he maintained, to the difference in pressure. Mr. Gray showed other slides in which titanium tetrachloride was used on models in his vertical wind tunnel. In addition to the vortex from the wing tip, travelling straight downstream, there was another, of opposite sign, flowing spanwise from the wing tip towards the end of the flap. He did not know if anyone else had observed this phenomenon.

Dr. Lachmann congratulated Mr. Gray on his free-lance research and said it was very valuable to have such independent work done. He thought Mr. Gray was now on the right track. Dr. Lachmann and Mr. Gray then had a little private war all on their own concerning spanwise flow, but the chairman suggested that this might be continued elsewhere.

Professor G. T. R. Hill resorted to fundamentals in pressing home his point that there was no equivalence between dihedral and sweep-back. The dihedral had a stabilising effect owing to the fact that when the airflow across the wing became diagonal, in a sideslip, the air first struck the leading edge at one point and then travelled to the trailing edge farther inboard; owing to the dihedral, this point was lower than the point at which the air had struck the leading edge, and thus an increase in angle was present, which had the effect of tending to lift the wing. With sweep-back, on the other hand, he explained that in a sideslip the air struck the wing on the side towards which the machine was slipping "broadside on," while it struck the other wing "end on." Thus it was seen that dihedral and sweep-back were quite different in their effects on lateral stability.

Having spoken as a private individual, he would now say a few words as a member of the Aeronautical Research Committee. Let it not be thought, he said, that any member of the A.R.C. held the view that all knowledge and learning was confined to official research establishments. He was sure all members of the A.R.C. welcomed very heartily such research as Mr. W. E. Gray was doing in his own little wind tunnel. He was glad to have heard designers express their views as to the kind of research that was wanted.

The second part of the discussion dealt mainly with structural problems, and opinions were divided as to whether, as Dr. Lachmann had stated in his lecture, the stressed-skin shell type of construction or the "concentrated flanges" type was the more economical from a weight point of view. Dr. Lachmann pointed out that in any case there could be but very little difference. When they came to very refined structures, the curve of efficiency became very nearly horizontal, so that the gain of one type of construction compared with another, provided each was good of its own kind, could represent but a small percentage.

SHEFFIELD at FULL BLAST

The A.I.D. Approved Inspectors' Dinner

PRODUCTION is at fever pitch in Sheffield. Each hour, figuratively speaking, sees steel and gold change hands. For some months now the great steel combines, some with works stretching for three and four miles, have been working three shifts a day, and still they would be more than pleased if they could double their weekly output.

It might be supposed that the Government "expansion" scheme is entirely the cause for this boom, but although large orders in connection with rearmament have been undertaken, foreign orders, successfully negotiated against outside competition and a great increase in the normal industrial demands, are to a considerable extent responsible. A large Italian order —for a coal-petrol plant—is at present being executed by the English Steel Corporation.

Steel firms must be farsighted, and they realise that they must continue to satisfy the needs of their well-established customers who have helped to build them up, as provision against the day when Government orders will dwindle. Although it might temporarily be more profitable to concentrate on armour plate, shells and guns it would mean, in all probability, a rather lean future.

On Tuesday of last week, in Sheffield, Mr. Gerald Steel, manager of Samuel Fox, Ltd., and director of United Steels, took the chair at the annual Approved Inspectors' Dinner, and in his speech talked of the S.B.A.C. aero engine manufacturers' scheme for reducing the number of steel specifications used in engine construction by the standardisation of seventeen new types with new series numbers to replace previous specifications.

It is unanimously agreed that such a scheme has been needed for a long time, but each designer has his own pet specification and it will need some considerable incentive to bring about a change. Put more directly, either (a) better steel must be offered at the same price, permitting an increase in strength-weight ratio or some other obvious advantage, or (b) approximately the same steel, but conforming to one of the new specifications, must be offered at a cheaper rate. The alternative to this is a joint decision by all steel combines to supply only steels of the agreed compositions, and then there can be no case of a manufacturer taking the view that "If you will not supply steel to my specification, there are plenty of others who will." There is one further difficulty; the specifications now under consideration allow quite large margins, and where a new series number may allow 5 to 9 per cent. of chromium, certain designers require 7 to 9 per cent. limits, probably for no other reason than that they have always previously used such steel; the same case applies to tensile limits.

Should the scheme for the seventeen new steels be accepted, some standardisation of the method of production will also be required.

The preceding observations, perhaps, tend to paint the aeronautical designer black, but this is because the argument stated is that of the steel people, while in truth the general good feeling and co-operation between these two parties demonstrates that both sides are anxious to reach a satisfactory decision on the matter. At the moment, then, the position is that the seventeen specifications have gained the approval of manufacturers in the S.B.A.C., and the Alloy Steels Association, and are understood to be receiving the official notice of the Air Ministry. This standardisation is in no way to impede the introduction of new steels.

Digressing for a moment from the A.I.D. speeches, it may be remarked that the research laboratories are one of the busiest departments in any steel works. The new laboratories of Samuel Fox are said to be the finest in Europe. This firm also have a new five-ton high-frequency electric furnace which, with a single exception, is unrivalled. Besides the routine inspections and usual tensile, impact and hardness tests, considerable time is being spent on creep tests. The fatigue tests seem very exacting, while other physical, magnetic and chemical investigations are receiving full attention.

Lt. Col. H. W. S. Outram, C.B.E., director of the A.I.D., acknowledged the toast and said that he had hoped that A.V.-M. Freeman would have been present to take his place, but this had proved impossible at the last moment. He hoped that the Approved Inspectors' Conference would be made great use of in the future, for such a body of seventy-two members must have all the knowledge available about steel in the kingdom.

Mr. C. Wilkinson, head of the Sheffield A.I.D., in proposing the toast of "The Approved Inspectors," said that more than 50,000 release notes had been signed during the year, but that only ten complaints had been registered, while of these only two were of a serious nature. He thought it would be an added incentive to do even better if inspectors flew aircraft made from steel which they had themselves inspected. He looked forward to the day when others would be able to follow the example of Captain Halcombe, of Kayser Ellison who is a pilot.

Mr. A. J. Grant, J.P., replying to the toast, was in favour of a production speed-up, and said that there was a real danger of hold-up due to over-inspection. He had no use, he said, for "new-fangled tests" revealing microscopical defects.

Possibly this remark implied disapproval of the "Fox inclusion count," a most exacting new form of inspection already officially adopted for some steels. By this count a sample of every billet is prepared and etched before being microscopically examined; the impurity included in the crystal structure of the metal is then counted over a certain standard area.

Mr. Grant also stressed the need of a first-class Sheffield airport.

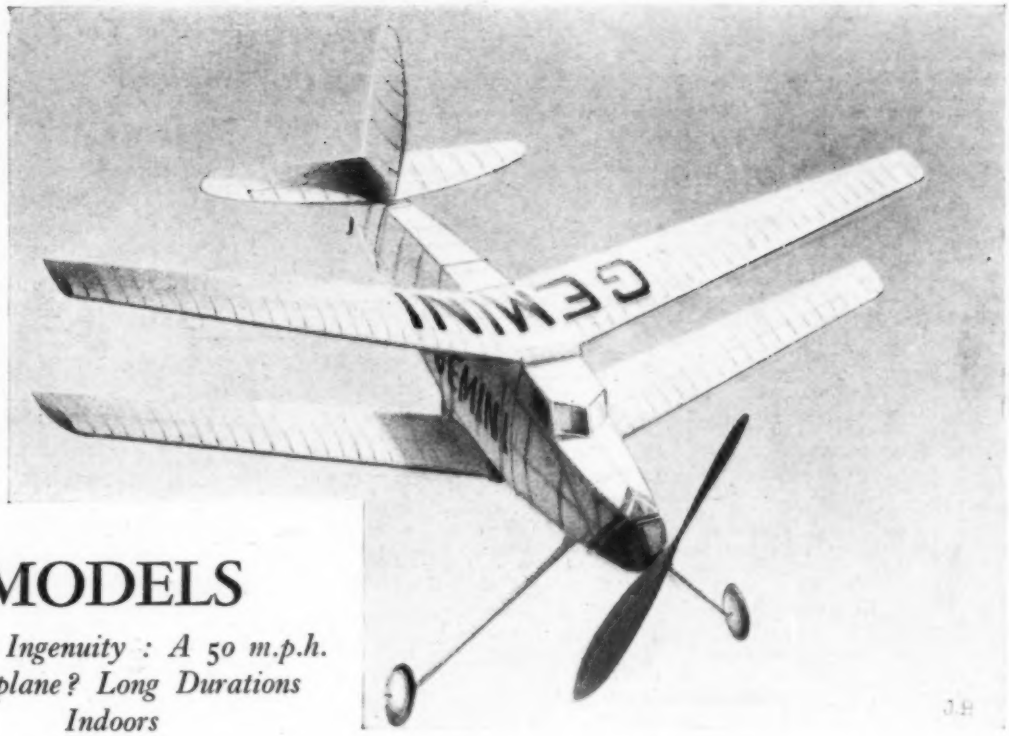
There are several interesting experiments being carried out at the present time which are common knowledge in the trade, but Sheffield has not escaped from the official secret rules, so that (if a lesson is to be learnt from Paris) some foreign manufacturer should be approached for further details. Perhaps the delay is to give the American officials "in the know" time for action. In that case the American Press may shortly give us the "low-down."

Pioneers and Production

MEMORIES of the early flying days were revived at the second annual dinner of Handley Page, Ltd., last Saturday, when Mr. Griffith Brewer, proposing the toast of "The Company," recalled that in the very early days of aviation Mr. Handley Page designed, built and flew his own monoplane. What Mr. Griffith Brewer did not mention was that "H.P." had a bet with Mr. Pemberton Billing about who could first get his "ticket." "P.B." won, but "H.P." had a good try.

During the war period, in 1917, Mr. Brewer continued, Mr. Handley Page found time to lecture at the R.Ae.S., and foretold the great future of the large aeroplane. Later he invented the slot, and Mr. Brewer caused amusement by stating that at first "H.P." was worried about the number of pennies he had to put into the slot. Later he merely had to hold a bucket under the slot and collect the royalties.

Mr. Handley Page thanked all those who, by their hard work, had enabled the firm to be well up to schedule with their production of the Harrow. He made the interesting announcement that the H.P.52 is to be built by other firms. The announcement of the addition of Mr. Hamilton and Mr. Easy to the board of directors was hailed with applause. Mr. "Jack" Jarvis, of the A.I.D., had arranged a very excellent programme of entertainment.



MODELS

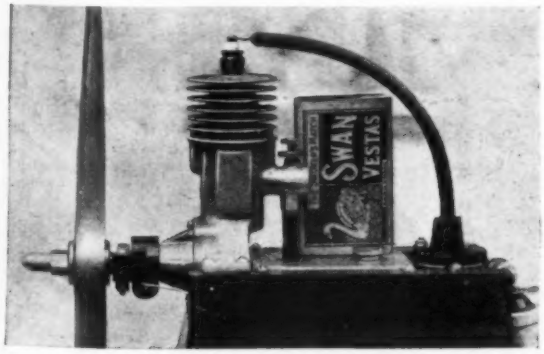
Biplane Ingenuity : A 50 m.p.h. Monoplane? Long Durations Indoors

By M. R. KNIGHT

Mr. H. E. White's biplane, described on this page. The appearance of a large degree of dihedral is illusory, and is due to the fact that the wings have considerable sweep-back.

A Record-breaking Biplane

THE production of a successful biplane model presents sundry snags, structural and aerodynamic, without offering much hope of such a flying performance as can be expected from the simpler monoplane. Hence the type is neglected, which is a pity, as, in addition to the interest, a shapely biplane model in steady flight looks attractive in the extreme. One of the finest examples is *Gemini*, which the designer, Mr. H. E. White, B.Sc., of the Northern Heights Model Flying Club, aptly describes as a robust general-purpose model on modern lines. It has proved thoroughly consistent in performance, able to take-off from rough ground and stay aloft for well over a minute. Further, it holds the hand-launched record for the class with a flight of 93 sec., and until recently held the rise-off-ground record of 79 sec.



Made by the Villiers Engineering Co. Ltd., Wolverhampton, of motor cycle engine fame, this new two-stroke unit for model aircraft has a cylinder capacity of 10 c.c. ($\frac{7}{8}$ in × 1 in. bore and stroke), roller-bearing big-end, and one-piece crankshaft. Weighing 19 oz. less batteries and coil, the engine develops $\frac{1}{8}$ h.p. The matchbox in the photograph provides a useful comparison.

Hard balsa is used almost exclusively for the structure, the covering material being bamboo paper, doped with banana oil. The total weight is 130z., of which the single skein of $\frac{1}{4}$in. rubber, 4ft. long, accounts for three.

Top and bottom wings are 46in. in span, are swept back 3$\frac{1}{2}$in., staggered 11in., and taper in chord from 6$\frac{1}{2}$in. to 3$\frac{3}{4}$in. There are about 6 degrees of dihedral on the lower plane, and slightly more on the upper. The total wing area is 400 sq. in. Balsa is used for leading- and trailing-edge spars, but the main spars are of $\frac{1}{8}$ × $\frac{1}{16}$in. pitch. There are no fewer than fifty-three ribs in the upper plane, and fifty in the lower, cut from $\frac{1}{32}$in. balsa sheet, and spaced $\frac{1}{4}$in. apart.

The fuselage is very interesting constructionally. L-section balsa is used for the longerons, $\frac{1}{8}$ × $\frac{1}{4}$in. balsa for the stringer along each side of the fuselage, and T-section balsa for lateral and vertical cross-struts. Bulkheads are eliminated. The length is 37in., the maximum depth 6in., and the maximum width 3$\frac{1}{2}$in. The simple cantilever undercarriage has proved entirely satisfactory. It consists of 2$\frac{1}{2}$in. hollow balsa wheels, mounted on bamboo legs which plug into tubes of rolled and glued paper concealed in the fuselage. The tendency of this arrangement to result in a broken fuselage is obviated by bracing the tubes to the stringers with thin bamboo.

Originally the tail-plane was of thin symmetrical section, and the designer intends reverting to this form. It is interesting to learn that the substitution of a tail with a heavily cambered upper surface and a flat lower surface has rendered the model erratic in behaviour and unstable under certain conditions. The tail-plane span is 21in., the chord tapering from 8$\frac{1}{2}$in. to 3$\frac{3}{4}$in. The fin, which is 10in in height, is built integral with the tail-plane. A basswood airscrew, 16in. in diameter, is used, and a free-wheel device is incorporated.

Speed Aspirations

IT will be recalled that Mr. White is the holder of the *Flight* Cup, which was awarded this year for the speed contest. His low-wing monoplane *Hornet*, described in the July 2 issue of *Flight*, won the contest at a speed of 42.61 m.p.h. It weighed 57oz., and had 1 sq. ft. of wing area. Mr. White is now at work on an improved low-wing racer for the 1937 contest. The fuselage will comprise numerous longerons and stringers with the interstices filled with balsa sheet, the whole

being sandpapered to a perfect elliptical cross-section. The estimated total weight is 72 oz. (24 oz. being rubber), the wing area 120 sq. in., and the loading 84 oz. per sq. ft., which is expected to secure a velocity in excess of 50 m.p.h. Mr. Simmonds, of the Blackheath Club, whose attractive mid-wing racer with monocoque fuselage will be remembered, is another enthusiast who is planning for a speed victory in 1937. Two other speed designs are known to be on the drawing board.

Until this year almost every speed victory has gone to a type of model which can be described as a "super-heated" general-purpose job. No disparagement is intended by this description, in fact, the writer can plead guilty to having tied for first place in a 1935 hand-launched speed contest by the process of removing the lower plane of a biplane, increasing the amount of rubber, and offsetting the thrust-line to deal with the terrific torque, thereby raising the speed from about 15 m.p.h to 31.46.

The prospect of a line-up of genuine racers is going to give timekeepers food for thought. The present system of flags and stop-watches worked well enough when only one of the contestants approached the 40 m.p.h. mark, as he could afford to lose a mile or two to any other model, but a more scientific timing system seems likely to be required for 1937.

The Farrow Shield Awarded

THE Farrow Shield is awarded each year to the club whose team of three scores the most points, each man's average of three hand-launched flights being totalled. This year victory has gone to the Northern Heights Model Flying Club, who scored 738.5 points. The Blackheath Club totalled 486, and the North Kent Club 453 points.

Indoor Aviation

THE second of a series of Indoor Flying Meetings arranged by the S.M.A.E. was held in the Royal Albert Hall, London, on November 26. No model weighing more than half-an-ounce is allowed to be flown. The type most favoured has a hollow motor-spar, and transparent "microfilm," about four ten-thousandths of an inch in thickness, is used for covering wing and tail. The fin is usually mounted below the tail-plane.

Mr. E. Ross (Northern Heights M.F.C.) raised the indoor fuselage record to 151.6 sec. with a 32in. span parasol weighing one-sixth of an ounce. The tail was carried on a slender outrigger projecting from a short, diamond-section fuselage. Wing, tail-plane and inverted fin were covered with microfilm, but Jap tissue was used for the fuselage. Mr. C. Gibson (N. Kent M.A.S.) coaxed 17 sec. from a small ornithopter, and Mr. G. J. Liggitt (T.M.A.C.) achieved 85 sec. with a tiny glider.

The longest flight was one of 200 sec. made by Mr. R. Copland (N.H.M.F.C.) with a microfilm "spar."

Further meetings will be held from 7.30 to 10 p.m. on December 9 and 22 and January 6 and 20. Admission tickets, 6d. each, available for any meeting, are obtainable from Mr. E. F. H. Cosh, 35, Maple Crescent, Sidcup.

Campbell-Orde's New Post

AFTER an association with Sir W. G. Armstrong Whitworth Aircraft, Ltd., lasting for more than twelve years, F/O. Alan C. Campbell-Orde, A.F.C., has resigned his position of chief test pilot and has been appointed operational manager of British Airways, Ltd. F/O. Campbell-Orde has just completed twenty years of active flying, having got his "ticket" and joined the Royal Naval Air Service in 1916. After serving in France and Belgium, he became one of the original members of No. 1 (Communications) Squadron, which laid the foundations of British civil aviation by "ferrying" notabilities to and from the Paris Peace Conference just after the war.

An interesting point is that Campbell-Orde was in No. 1 Squadron with Maj. J. R. McCrindle, O.B.E., M.C., now managing director of British Airways.

In 1919 Campbell-Orde joined Holt Thomas's firm, Aircraft Transport and Travel, Ltd., and with other stalwarts helped to maintain air transport with very indifferent flying equipment. From 1921 to 1923 he was instructor to the Chinese Government at Pekin, and in 1924 he joined Armstrong Whitworth. In addition to his duties as chief test pilot, he was also chief instructor to that company's R.A.F. Reserve Training School at Whitley until the school was formed into Air Service Training and removed to Hamble.

A Consultant's Number

THE Lindsay Neale Aviation Co., of 7-8, Norfolk Street, Strand, London, W.C.2, announce that their telephone number is now Temple Bar 2277, or alternatively, Mr. Lindsay Neale is available at Barnet 0621.

Bristol Interim Dividend

THE directors of the Bristol Aeroplane Co., Ltd., have declared an interim dividend of 7½ per cent., subject to deduction of income tax, upon the ordinary shares. The register is closed until December 8 inclusive, and the dividend warrants will be posted on December 7.

It is stated that while the new ordinary shares issued last July rank for dividend as from January 1, 1936, including the interim dividend now declared, the new capital can provide only a partial contribution to the earnings of the current year, the effect of which in relation to the total dividend payable for the year 1936 can be more conveniently considered in connection with the final dividend.

NEW COMPANIES

In the notes below, for reasons of space, the "objects" of new companies are usually somewhat abbreviated.

PREMIER AIRCRAFT CONSTRUCTIONS, LIMITED, was registered as a private company on November 2, with a nominal capital of £500 in 500 shares of £1 each. The objects are to acquire the business of aircraft designers, builders and repairers with all its attendant departments recently carried on by R. Gordon and M. G. Chadwick as the Canute Air Park Co., at Ashington, Essex. The first directors are: Raymond Gordon, engineer; Mervyn G. Chadwick, aerodrome manager. The registed office is at 5, John Street, Bedford Row, London, W.C.1.

GLASGOW MODEL AIRCRAFT AND GENERAL MANUFACTURING COMPANY, LTD.—Private company, registered in Edinburgh on October 28. Capital £1,000 in £1 shares. Objects: To carry on the business of makers of and dealers in models of all kinds, manufacturers of toys, electrical accessories, ornaments, etc. The directors are: John Chalmers, 213, Buchanan Street, Glasgow, model maker, and James Gairns, Primrosehill, Cults, Aberdeenshire, salesman. Registered office: 13, Dundas Street, Glasgow.

EUROPEAN AIR COMMUNICATIONS, LIMITED, was registered as a private company on November 7, with a nominal capital of £100 in 100 shares of £1 each. Objects are to construct, equip, maintain and work aircraft of all kinds, etc. The first directors are to be appointed by the subscribers. Solicitors: Deacon and Co., 29, Gt. St. Helens, E.C.3. The registered office is at Adelaide House, King William Street, E.C.4.

DRAY PUBLISHING AND SERVICES COMPANY, LTD.—Private company. Registered November 11. Capital £2,000 in 4,000 shares of 10s. each. Objects: to carry on the business of magazine and periodical publishers, manufacturers and sellers of model aeroplanes and the parts thereof, etc. The directors are: Hubert H. Dray, publisher; Mrs. Ellen L. Brisley. Registered office: 16, Grays Inn Road, W.C.1.

H. L. CABINET WORKS, LIMITED, was registered as a private company on November 10 with a nominal capital of £100 in 500 ordinary shares of 4s. each. The objects are to carry on business as manufacturers of, and dealers in, cabinets, furniture, timber and plywood, aeroplanes and aeroplane parts, lorry and motor car bodies, etc. The first directors are not named. Solicitors: Clifford-Turner and Co., 11, Old Jewry, London, E.C.2.

V. W. DERRINGTON, LTD.—Private company. Registered November 14. Capital £500 in 500 ordinary shares of £1 each. Objects: to carry on the business of dealers in, hirers, repairers and cleaners of aeroplanes, motor cars, motor cycles, etc. The directors are: Victor W. Derrington, and Albert E. Allen. Registered office: 159, London Rd., Kingston-on-Thames, Surrey.

CHANGE OF NAME

STANLEY JOHNSON, LTD., (engineers, manufacturers of aircraft, motor cars etc.) 29/31, Euston Road, N.W.1.—Name changed to Johnsons (Holdings) Ltd., on October 22, 1936.

INCREASES OF CAPITAL

CIERVA AUTOGIRO COMPANY, LTD. (Bush House, Aldwych, London, W.C.2).—The nominal capital has been increased by the addition of £50,000 beyond the registered capital of £205,000. The additional capital is divided into 25,000 preference and 25,000 ordinary shares of £1 each.

AIR COMMERCE, LTD. (Brettenham House, Strand, London, W.C.2).—The nominal capital has been increased by the addition of £26,000 in £1 ordinary shares, beyond the registered capital of £4,000.

FLIGHT REFUELLING, LTD. (130, Wilton Road, London, S.W.1).—The nominal capital has been increased by the addition of £1,000 in £1 ordinary shares, beyond the registered capital of £1,000. At November 20, 1936, Sir Alan J. Cobham, K.B.E., A.F.C., held 555 shares and Imperial Airways, Ltd., held 831 shares out of 1,385 shares issued.

AERONAUTICAL PATENT SPECIFICATIONS

(The numbers in brackets are those under which the Specifications will be printed and abridged, etc.)

(Published November 26, 1936.)

14178. BENDIX, LTD., and HALL, P. E.: Means for operating aircraft brakes (455,932).

14545. DOWTY, G. H.: Shock-absorbing struts for aircraft undercarriage and like purposes (455,719).

20410. HEINKEL, E.: Wings or control surfaces for aircraft (455,721).

35107. FAIREY AVIATION CO., LTD., BOLTON, F., DUNSFORD, C. G. J., and HAND, P. G. E.: Water rudders for flying boats and seaplanes (455,745).